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E. A. SIMMONS, *President.*
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ROY V. WRIGHT, *Managing Editor.*

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Managing Editor, ROY V. WRIGHT, Woolworth Bldg., New York, N. Y.
Business Manager, None.
Publisher, SIMMONS-BOARDMAN PUBLISHING CO., Woolworth Bldg., New York, N. Y.
Owner, SIMMONS-BOARDMAN PUBLISHING CO., Woolworth Bldg., New York, N. Y.

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PURCHASE OF THE RAILWAY ELECTRICAL ENGINEER

The Railway Electrical Engineer, which is now published by the Wray Publishing Company, at Chicago, has been bought by the Simmons-Boardman Publishing Company, the publisher of the *Railway Age Gazette, The Signal Engineer* and the *Railway Age Gazette, Mechanical Edition.* Beginning with November it will be issued by the Simmons-Boardman Publishing Company from its New York office, Woolworth Building, New York City. It will not be consolidated with any of the other periodicals of this company, but will be continued as a separate monthly publication. Edward Wray, heretofore publisher of the *Railway Electrical Engineer,* will remain with the paper, becoming business manager.

The use of electricity on steam railways has for some years been fast becoming more varied and extensive. One needs but refer to its increasing adoption for the lighting of trains and in connection with the operation of shop machinery and block signals for an illustration of this statement. Of even greater significance is the progress which has been made in the electrification of steam railways. While the mileage which has been electrified is comparatively small, the number and variety of the pieces of work that have been carried out and that are under consideration are great; and there is ample reason for believing that within the comparatively near future there will be a material increase in the mileage.

It is evident that there is a large field of usefulness for a publication devoted especially to the technical details of the numerous problems raised by the increasing use of electricity on steam railways. It is to this field that the *Railway Electrical Engineer* has devoted itself in the past with much success. It is to this field that, under its new management, it will continue to devote itself; and since, under the new management, it will be able to command the services of a larger staff of experts in the field of railway transportation, it is to be hoped and expected that it will be able to cover its field even more successfully. The readers of the *Railway Age Gazette* will profit also by the addition of a strong electrical engineering staff.

Speed or Accuracy

Recently the Interstate Commerce Commission's valuation forces have been making more rapid progress. In part, of course, this is probably due to the fact that the organization is becoming more skilled, but it must be remembered that it would be folly of the most expensive kind to sacrifice accuracy for speed. One party recently "valued" a rather difficult line at an average of something faster than four miles per eight-hour day. On an old line, where it is difficult to determine where the original surface of a hill through which a cut has been made was, where ballast may have worked down to a great depth in some places and be comparatively shallow in others, where the only way to determine the proportion of various kinds of ties is to inspect considerable portions of each mile, and where structures are of varying degrees of age and of material and of original cost, it would seem that to cover four miles in an eight-hour day, the cross section party, which was the slowest party, consisting of two I. C. C. inspectors and one railroad man, means either that the commission has secured remarkably efficient men or that guesses are being pretty freely used. All through the hearing before the commission, reported elsewhere in this issue, insistence was placed on the vital necessity for absolute mathematical accuracy in the collection of data. Nothing would be so fatal to a valuation, if it were to be attacked in a court of law, as to show that the commission's data on

which the valuation was based were inaccurate or incorrect. In the interests of all concerned, therefore, it is of utmost importance that accuracy shall not be sacrificed for speed.

Erroneous Statement as to Express Earnings

In an editorial in the *Railway Age Gazette* for September 24, page 549, on "Railway Returns for the Fiscal Year," it was erroneously stated that the express earnings of the railways per mile had been reduced from $960 in 1914 to $302 in 1915. The $960 item for 1914, as shown in the Interstate Commerce Commission's summary, includes earnings from mail, express and other transportation combined, while for 1915 these three classes of earnings are separated, as follows: Mail, $249; express, $302, and other transportation, $366, making a total of $917, which is comparable with the $960 for 1914. Also these three items should have been bracketed in the table published on page 539, to show the true comparison with the 1914 figures.

Co-operation Between Fuel Men and Traveling Engineers

At the recent convention of the Traveling Engineers' Association favorable action was taken on the recommendation that arrangements be made with the International Railway Fuel Association to hold the conventions of the two associations on consecutive dates for the purpose of enabling those who are members of both associations to attend both conventions with a reduction in the amount of time they are absent from their roads. This is a step in the right direction and shows a disposition on the part of the railroad men to get the most they can out of the time spent away from their offices. Such an arrangement in the case of these associations is especially logical, as there are many men who are members of both organizations, there being numerous subjects considered in the Fuel Association of direct interest to the traveling engineer. The plan should receive the hearty support of the higher mechanical officers, who would find it much to the advantage of their roads to have their men attend both conventions. The making of final arrangements was left to the executive committees of the two associations.

A Signaling Experiment at Oroville

The cab-signal and automatic-stop installation lately put in use on the Western Pacific at Oroville, California, and described on another page of this issue, will command widespread interest; and this notwithstanding the inventor's apparent indifference to some of the demands of conservative signal engineers. It is the first example, anywhere, even for a short distance, of automatic block signaling—maintenance of the space interval between trains without the intervention of signalmen—where no visual roadside signals are provided, and the report of the experience of twenty or more enginemen with this arrangement will be awaited with active curiosity by railroad men everywhere. It is also the first serious attempt to employ magnetic induction for an automatic stop. As in some quite respectable experiments made before now, the dangers of the "open circuit" are boldly faced, and large dependence is placed on excellence of material and workmanship and first-class care and inspection; though railroad officers are always demanding appliances which will be safe in spite of deficiencies in these respects. The boldness of the proprietor is evidenced also in the provision of apparatus which, apparently, has been multiplied regardless of expense; and the reduction of the capacity of the railroad by the use of the overlap has for him no terrors. For satisfactory tests the absence of a severely cold climate is a great disadvantage; but in other respects this installation should afford opportunity for making numerous instructive studies, and it is to be hoped not only that thorough studies will be made, but that the world will be given the benefit of them.

"RAILROAD BANKRUPTCY"

UNDER the above caption the Des Moines Register and Leader refers to an editorial in the *Railway Age Gazette* of October 1, showing that the mileage of railways in the hands of receivers in the United States is now greater than at any past time. The Register and Leader remarks that these statistics were published just when the western rate case had been reopened. We assure our esteemed but somewhat suspicious contemporary that this was entirely a coincidence. It just happened that the receivership record was broken at the very time when the western rate case was being reopened. If it had been broken earlier we would have mentioned the fact sooner. The Register and Leader also comments on the fact that we published the statistics "unaccompanied with any explanation of causes, or suggestion of remedies," and remarks that why this was done "must be left open to conjecture." It need not remain open to conjecture any longer. The *Railway Age Gazette* in every case where a large railway has become bankrupt has presented what it has regarded as the explanation. It has also repeatedly suggested what it believes are the remedies for the conditions which are putting so many railways into the hands of receivers. We supposed that our views on this general subject were familiar to our readers. Since, however, our contemporary apparently desires us to repeat them we shall gladly do so.

Evidently the Register and Leader has not been so diligent a reader of our columns as it must be if it is to keep correctly informed regarding developments in the field of transportation in this country. Because of this lack of diligence on its part it uses language indicating that it assumes that the *Railway Age Gazette* attributes the grief to which all the bankrupt roads have come entirely to government regulation. This assumption is not correct. The *Railway Age Gazette* knows as well as the Register and Leader, and perhaps even better, not only that the troubles of numerous roads are due largely to their own mismanagement, but also some of the forms which this mismanagement has taken. For example, we recognize the fact, and always have, that the Wabash became bankrupt chiefly because it was overcapitalized and because its credit was unwisely used in various ventures, especially in securing a very expensive entrance into Pittsburgh. We have said in past issues that the Rock Island was brought to its present plight largely because the Reid-Moore interests, for their own selfish purposes, piled one holding company on another, thereby putting a strain on the earning capacity of the property which it could not hope to stand, except under highly favorable business conditions, and because these interests made investments of the road's assets in outside properties in which it was neither wise nor righteous for them to make such investments. Likewise, we have pointed out that the necessity for the receivership of the Frisco was produced largely by forms of financial mismanagement which few railway men would care to try to defend.

But it is not a fact, as the Register and Leader implies, that in not a single case has a railway recently become bankrupt without having been wrecked by "bad management or worse." Where, for example, was the "bad management or worse" on the Missouri, Kansas & Texas? The only crime that its management has committed, so far as we have ever heard, is that of issuing more short time notes, to raise money for needed improvements, than it could get renewed. It would not have issued the short time notes if it could have issued bonds at a reasonable rate of interest, and it would not have issued bonds if it could have sold stock at a reasonable price. The management and operation of the property appear actually to have been better when it became bankrupt than they ever were before.

The same thing may be said of many other railways that are now insolvent. There are in this country 82 railways, large and small, in the hands of receivers. Where is the evidence that the plight of every one of them, or of more than a few of them,

is due to mismanagement? It has not been forthcoming. But suppose it is a fact that the railways which are broke are those which have been the poorest managed. Has that any significance? Is it to be assumed that the best managed and strongest will become bankrupt first? Naturally it is the weakest, whether from poor management or other causes, that first go down. If a man has a cold it usually settles in the weakest part of his organism. Is the fact that it settles in a weak spot any reason for neglecting it? People die from pneumonia or tuberculosis who proceed on that theory. So if the fact that the railways which are considered the weakest are going into the hands of receivers is not recognized as indicating a serious condition for our entire railway system, the ultimate results will be disastrous for all the railways.

The Register and Leader says that "if there were any predisposing cause for universal railroad bankruptcy outside of the bond and stock operations of the railroad speculators" the *Railway Age Gazette* would doubtless set it forth, "with great clearness and force." There is such a "predisposing cause" and since our contemporary both wants and needs light on the subject we shall take pleasure in shedding it. In numerous instances there have been special reasons, taking more particularly the form of financial mismanagement, why individual roads have gone into the hands of receivers. But there have also been extremely strong and unfavorable "predisposing causes" affecting almost all of the roads, and these influences have been more or less largely responsible for the failure of every road that has become bankrupt. Furthermore, unless the force of these influences is mitigated there will be a steadily increasing number of roads turned over to the courts for operation. Since the Register and Leader has mentioned the western rate case, we shall refer especially to figures for the roads directly interested in that case.

In its opinion in the western rate case (page 521), the Interstate Commerce Commission quotes stastistics introduced by the carriers showing that in the six years from 1907 to 1913 the increase in the cost of road and equipment of 41 western roads was $1,070,000,000, and that the increase in their net operating income was only $12,300,000. The increase in net operating income was only sufficient to yield 1.2 per cent on the increase in cost of road and equipment. In the same opinion (page 521) the commission gives figures compiled by itself for 26 western roads showing that during the same six years the increase in their investment in road and equipment was $990,000,000, and that the increase in their net operating income was only $7,300,000. Therefore, the increase in net operating income was sufficient to yield a return of only 7/10 of 1 per cent on the increase in property invested. In the same opinion the commission specifically vouches for the correctness of the statistics of the roads regarding increases in property investment since 1907. In other words, the increase in net returns was far less than adequate to pay bare interest on the added investment. Advancing a year further, we find that between 1907 and 1914 the increase in cost of road and equipment of 41 western railways was $1,235,876,642, while between the same years there was an actual *decrease* in their net operating income of $23,599,435. In other words, after increasing the investment in their properties $1,235,000,000 they had less net money with which to pay a return on investment than they had before. It should be noted that these figures are not affected by the financial management of the roads, whether good or bad. They are based on actual investment, actual earnings, actual expenses and actual taxes, and have no reference to capitalization, and it is hard to see how the relations between them could have been different, no matter how different the financial management of individual properties might have been.

Why has the operating income of these roads been declining while the investment in them has been increasing? Here are some of the reasons. Between 1907 and 1914 the average annual wage per railway employee in the western district increased 22.6 per cent. During the same period taxes per mile on the western lines increased from $226.24 to $426.67, or over 70 per cent. It is easy to see the effect of these increases in wages and taxes on the financial position of the 41 roads that are parties to the western rate case. Between 1907 and 1914 the total operating revenues per mile of these roads increased from $8,704 to $9,267, or 6.4 per cent. Their operating expenses and taxes increased, meantime, from $6,084 to $7,110, or 16.8 per cent. The result was that their operating income declined from $2,620 to $2,157, or 17.3 per cent. It will be noted that this reduction in net took place in spite of the fact that there was an increase in gross, and this increase in gross merely reflects the fact that the railways handled more traffic and rendered more service per mile to the public at the end of the period than at its beginning.

Now, turning to the cases of individual properties, let us examine the figures of certain of the roads which have become bankrupt. Perhaps they also will throw some light on the nature of what the Register and Leader has so happily called the "predisposing cause for universal bankruptcy." If we should find that these individual roads enjoyed an increase in their net return and become bankrupt in spite of that, this would be conclusive reason for attributing their downfall solely to financial mismanagement. But as a matter of fact, in every case they have had heavy reductions in their *net return from operation,* as indeed has been true of a very large majority of the railways in western territory, regardless of whether they have been well or ill managed financially.

The following comparisons are all for the years 1907 to 1914. The operating revenues per mile of the Missouri Pacific increased from $6,378 to $6,790, or 6.4 per cent. Its operating expenses and taxes increased from $4,754 to $5,954, or 25 per cent, and in consequence its operating income decreased from $1,624 to $836, or 48 per cent. The operating revenues per mile of the St. Louis & San Francisco increased from $7,735 to $8,540, or 10.4 per cent. Its operating expenses and taxes increased from $5,059 to $6,585, or 36 per cent, and its operating income decreased from $2,676 to $1,955, or 26.9 per cent. The operating revenues per mile of the Wabash increased from $10,904 to $11,933, or 9.5 per cent. Its operating expenses and taxes increased from $8,468 to $11,095, or 31 per cent, and its operating income decreased from $2,436 to $838, or 65 per cent. The operating revenues per mile of the Rock Island lines increased from $7,821 to $8,313, or 6.2 per cent. Their operating expenses and taxes increased from $5,696 to $6,859, or 20 per cent, and their operating income decreased from $2,125 to $1,454, or 31 per cent. The Missouri, Kansas & Texas had a different experience from any of these roads. It had a decrease in total earnings per mile as well as in net return. Its operating revenues per mile declined from $8,523 to $8,241, or 3.3 per cent. Its operating expenses increased from $5,753 to $6,469, or 12 per cent, and its operating income decreased from $2,770 to $1,772, or 36 per cent.

The foregoing figures make it clear that these roads were not reduced to bankruptcy, as is so often implied, solely by financial mismanagement. They suffered during these seven years reductions in the net return per mile available for capital purposes varying from 27 to 65 per cent; and all the railways involved in the western rate case suffered an average reduction of 17 per cent. There are a few strong roads that have come through in fine shape, but a large majority would be suffering from the effects of the heavy reduction in their net return if the financial management of all had been as good as that of the best. Now, why did these reductions in net return occur when operating revenues were increasing? Simply because wages and taxes increased and the regulating authorities would not allow the increases in rates that were required to offset the unavoidable increases in outgo.

The Register and Leader, by implication, called on the *Railway Age Gazette* not only to state the causes of "railroad bankruptcy," but also to suggest the remedies. We are not averse to trying to do so. The Register and Leader doubtless will be surprised to find that one of the remedies we suggest is that the Interstate Commerce Commission be given some form of authority to regulate the issuance of railroad securities which will make impossible such financial mismanagement as has oc-

curred on the Rock Island, the Frisco, the Wabash and other roads. It may also be surprised to learn that we began advocating this kind of legislation before the Hadley Railroad Securities Commission made its report, which probably was before it was advocated by the esteemed Register and Leader. But, as the facts clearly show, no amount of regulation of securities in the past would have prevented financial distress on the part of many railways, simply because their financial distress is due mainly to the circumstance that their expenses and taxes have been increasing faster than their earnings. Regulation of the issuance of securities would not have prevented the reduction of net return from operation in the past, and it would not cause an increase in net return from operations in the future. The only thing which will make the net return of most of the railways adequate is the application of the second remedy we suggest, viz., an increase in rates; and the needed increase in rates cannot be obtained except with the consent of the regulating authorities. Because the regulating authorities have refused the needed increase in rates in the past they must shoulder their share of responsibility for the fact that there are now more miles of railways in the hands of receivers than ever before. If they continue to refuse it they will have to shoulder their share of responsibility for the additional bankruptcies that will occur.

When allusion is made to the unsatisfactory condition to which the railways of the country have been brought some people grow red in the face and shout, "Regulation!" But that is not the entire explanation. It is only part of it. Other people, when the same subject is mentioned, get red in the face and bellow, "Wall street!" That is not the entire explanation, either. The trouble is due mainly to a combination of regulation and Wall street, with a dash of labor unionism to add spice. This, at least, is the explanation of the *Railway Age Gazette*. If the Des Moines Register and Leader, or any other authority, can offer a better one it would be both welcome and useful.

GRADE CROSSING ELIMINATION

THE railroads entering the city of Chicago have spent, to date, about $75,000,000 for the elimination of grade crossings within the city limts. It is understood that this work is to be continued until all tracks in the city have been elevated, at an ultimate cost to the companies of more than $150,000,000. Without question, the roads have enjoyed some return for the money expended in the way of economies of operation from increased speed of trains, elimination of crossing watchmen, and also from a reduction in damage claims. The inference that these savings represent a reasonable return on the investment is, however, without foundation. It is doubtful if the most reasonable estimate of the savings would be over 25 per cent of the interest charge. The reports of the Chicago Track Elevation Commission have cited a number of material advantages accruing to the public, among which are mentioned the saving in time to people using the streets and the reduction in fire hazard owing to the elimination of delays to fire-fighting apparatus, but these are advantages which are too intangible to be measured in figures of dollars and cents.

It is clear, therefore, that this vast outlay requires justification in terms not expressed in dollars and cents, and is to be justified presumably by the reduction attained in loss of life and limb from grade crossing accidents. Unfortunately, there are no records of grade crossing accidents available antedating the inception of track elevation. The earliest authentic records are for the year 1899, after the raising of the tracks had been in progress for seven years. As shown in the accompanying diagram, there has been a noticeable reduction in the number of these accidents, and it is but fair to point out that this reduction does not represent the full effect, since it has taken place during an enormous increase in the population.

Granting that we cannot measure lives in cash, and assuming that separation of grades in Chicago has been amply justified by the results attained, it will be interesting to note the lack of interest of the public in measures to reduce accidents from other causes. The question arises, whether money being spent in Chicago for track elevation would not cause a greater reduction in accidents if expended along other lines.

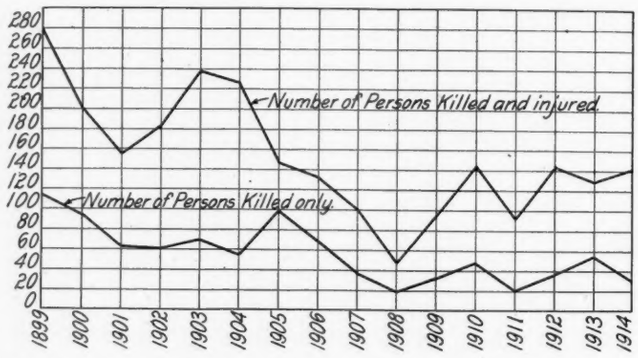
In 1914, 31 persons were killed and 111 were injured by trains crossing city streets. In the same year 100 others were killed and 148 were injured by being hit or run over by trains at points not on public streets. By far the most of these were trespassers, many of whom were on the tracks that have been elevated, yet these accidents concern the city so little that it offers the railroads almost no assistance or even encouragement in their efforts to reduce trespassing. That there has been an enormous increase in accidents to pedestrians because of automobiles is generally known, but the situation thus created does not often receive forcible expression and actual statistics such as we give below for the city of Chicago are rarely given publicity.

COMPARISON OF CASUALTIES TO PERSONS AT GRADE CROSSINGS OF RAILROADS AND STREETS, WITH CASUALTIES TO PEDESTRIANS WHO WERE STRUCK OR RUN OVER BY VEHICLES ON STREETS*

Year	Grade Crossing Accidents		Run Over or Struck by Vehicles	
	No. Killed	No. Injured	No. Killed	No. Injured
1905	99	48	34	602
1906	68	65	45	643
1907	38	62	48	774
1908	20	27	53	878
1909	33	63	57	1124
1910	48	96	52**	946**
1911	20	72	103	1843
1912	37	107	75	2530
1913	54	77	86	3012
1914	31	111	143	3455

* Not including street cars.
** Record is for automobiles only. Record for other vehicles was not available.

In comparison with the figures for street vehicle accidents, those for the grade crossing accidents are insignificant, yet the appalling increase in the former during the last 10 years has excited no demand for remedial measures other than suggestions to introduce auto-dodging into the curriculum of the public schools and the passing of traffic regulations that are violated daily by most of the motorists.



Record of Casualties at Grade Crossings of Streets and Railroads in Chicago for 16 Years

A large part of the growing demand for elimination of grade crossings is a direct result of the increase in the use of motor vehicles, particularly in rural districts. In many cases, as for instance on the Long Island Railroad, conditions have become serious, not because of an increase in the railroad traffic, but on account of the marked change in the character and density of the highway traffic. Notwithstanding this, the railroad is receiving scant co-operation from the public in its efforts to prevent accidents.

The public habit of requiring the railroad to "pay the piper" is especially evident in connection with this problem. Grade separation agitation in rural communities generally subsides very quickly when it becomes apparent that the state commission proposes to place a material portion of the burden of expense on the town or county. Plans for track changes which promise numerous damage claims against the city must be discarded for

others which reduce the potential damages, although they result in much greater expense to the railroad. Park boards insist that track elevation structures must beautify the boulevards (at the railroad's expense) as well as separate the grades.

That the railways must do their part notwithstanding apathy on the part of the people concerning other related matters can be illustrated no better than by a comparison of conditions on a well-known Chicago boulevard with those on a line of railroad parallel to the boulevard less than three blocks away. The railroad tracks are being elevated at a cost of $3,000,000. Assuming that this work is justified, the fact remains that the trains are short, the crossings are well protected by gates and watchmen, and to cross the tracks involves small delay and occasions no alarm. Not so with the boulevard. The traffic is continuous and at only one crossing is it ever interrupted for the benefit of traffic on the cross street. At all the other streets within three miles the pedestrian is able to cross only by "making a run for it" and a timid individual may have to wait minutes for a sufficient lull in the traffic to venture off the curb. The hazards to the pedestrian in crossing this boulevard are much greater than those incurred in crossing the railroad; but no one has yet suggested elevation of the boulevard.

THE VALUATION HEARING AT WASHINGTON

ONE fundamental difficulty with the valuation of railroads is that there is no generally agreed on definition of value. In a sense, the brief and the oral argument presented by the President's Conference Committee of the railroads to the Interstate Commerce Commission, in the hearing on the principles which govern in the federal valuation of railroad property, was an attempt to get before the commission a description of what must be included as value, which cannot be taken away without due process of law. Some of the questions asked by the commissioners and by representatives of the state commissions might be taken as indicating that they thought that the railroad companies were attempting to play a game of "heads I win, tails you lose," in their definition of value. Thus, if a railroad received a right-of-way free 30 years ago, it claims that the determining factor in value—not, of course, the sole factor, but still the determining factor—is the estimated cost of that right-of-way were it to be acquired today through purchase or condemnation proceedings; while, on the other hand, it claims a higher value for land which is to be used for railroad purposes than would be the value of that land were it to be bought for agricultural or other purposes.

Again, in the question of depreciation and appreciation the railroad company claims that the added value which comes with the seasoning of a railroad roadbed should be an element in determining its value and that this appreciation should be allowed for; while, on the other hand, it claims that no allowance should be made for depreciation based on a theoretical estimate of the length of life of classes of material which are being continually renewed in the ordinary course of maintenance.

If, however, a careful study is made of the brief filed by Pierce Butler and his associates on behalf of the Presidents' Conference Committee, it will be seen that any such construction put on these arguments is erroneous. In the first place, it must be remembered that all that Mr. Butler is trying to do is to enumerate and describe the elements which go to make up value. There is no attempt made to urge on the commission an acceptance of any theories as to what weight should be given to these elements or as to how they should be combined to finally determine value. It must be remembered that there are three cost figures which the commission is to report to Congress. These are original cost, the cost of reproduction new and the cost of reproduction less depreciation. Now, if we keep to cost and try to avoid as much as possible the use of the word value, the position taken by the carrier's counsel would seem to be entirely logical. The railroad companies do not contend that in determining value the original cost of right-of-way cannot be taken into consideration. On the other hand, they specifically furnish the figures for the determination of this original cost as nearly as possible. What they do argue is that when a distinct cost, the cost of reproduction new, is to be determined the original cost has no bearing whatsoever on the facts. Regardless of what may be the theories of any one as to the right of a railroad company to participate in the increment in general values which takes place with the passage of time and the growth of population, these theories are not and should not be a factor in determining a question of fact, namely, what would be the cost of reproduction new of a given railroad property? This is something that is so, regardless of whether the man who determines it is a socialist or a firm believer in the sacredness of the rights of property.

CHICAGO & NORTH WESTERN

THE Chicago & North Western had to handle almost as much business in 1915 as in 1914, notwithstanding the fact that the company received $3,780,000 less revenue in 1915 than in 1914. The really remarkable thing, however, is that in handling almost as great an amount of business the company was able to save in expenses $3,930,000, so that its net operating revenues were actually slightly greater in 1915 than in 1914.

The explanation of the decrease in revenues is that the company received a ton-mile rate lower by 3.45 per cent in 1915 than in 1914 and the average passenger journey was shorter by 2.76 per cent and receipts per passenger per mile were less by 1.09 per cent. The explanation of the lower freight rate is in part presumably the result of the difference in the proportion of the various classes of commodities carried and like the lower passenger rate is the result of the working of the Minnesota rate case decision.

The Chicago & North Western operates 8,108 miles of road, of which 907 miles have second track, and included in this 907 miles is 104 miles which has third track and 95 miles which has fourth track. As will be seen from the map, the company has a double-track main line of heavy traffic density from Chicago to Omaha and a line in connection with the Chicago, St. Paul, Minneapolis & Omaha mostly double track from Chicago to Minneapolis. It has a network of lines in Wisconsin, another network in Iowa, and a main line and branches extending into the Dakota wheat country and across the northern part of Nebraska into Wyoming.

In 1915 the company handled 6,216,000,000 ton-mile of revenue freight, which was a decrease of less than a quarter of one per cent from the ton mileage handled the year before. Freight revenue amounted to $51,924,000, a falling off of $2,066,000, or 3.8 per cent as compared with the year before. The revenue per ton per mile was 8.4 mills in 1915 as against 8.7 mills the year before.

The total number of passengers carried amounted to 33,080,000, a decrease of less than one per cent as compared with the previous year. Passengers one mile was less by 3.68 per cent, the average distance traveled per passenger being 34.17 miles as against 35.14 miles the year before. Apparently this means a falling off in through passenger business, due presumably to the unsettled business conditions and economies which they necessitated. It is hard enough to reduce passenger train mileage to meet a falling off in local business and it is almost impossible to reduce train mileage to correspond with the falling off in through business; that is why passengers carried rather than passenger milcage is a criterion of passenger business in this case and why the statement that there was almost as much business that had to be handled in 1915 as in 1914 is justified despite the smaller passenger mileage. The average rate per passenger per mile was 1.82 cents as compared with 1.84 cents, a decrease of 1.09 per cent.

Total operating expenses amounted to $56,372,000, a decrease, as previously mentioned, of $3,930,000 as compared with the year before. More than half of this decrease is accounted for by a saving in transportation expenses, the total transportation expenses in 1915 being $29,753,000, or $2,196,000 less than in the

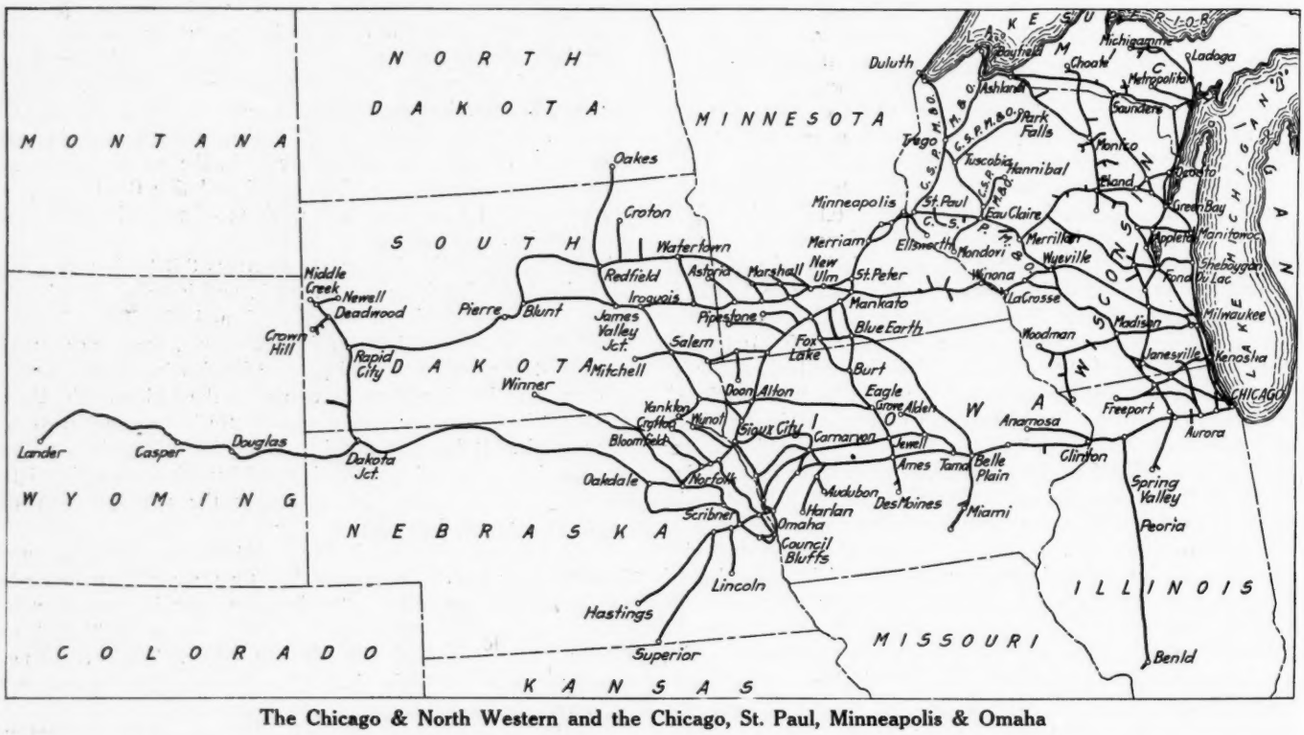
previous year. This is a real achievement, to cut down transportation expenses while doing as big a business as heretofore in the face of the present trend of prices. The largest single item of saving was in fuel for train locomotives, which cost $5,083,000 in 1915, a decrease as compared with the previous year of $964,000. The total freight train mileage was 17,251,000, which was less by 5.81 per cent than in the previous year, and the trainload of all freight east of the Missouri river was 480 tons, an increase of 8.44 per cent over the previous year, and for the whole road 443 tons, an increase of 7.68 per cent. Two other large items of saving were in payments for loss and damage to freight and injuries to persons. Payments on these two accounts in 1915 amounted to $1,827,000, a decrease of $468,000.

The remainder of the saving in expenses was made in a smaller expenditure for maintenance of way and structures. The expenditure on this account in 1915 was $10,451,000, which was less by $1,762,000 than the previous year, the larger items of saving being in roadway maintenance and track laying and surfacing, in rails, in ties, and in maintenance of structures.

There was no cut in maintenance of equipment expenses, ever, on the North Western is pursued it will in a short time bring up the depreciation reserve to a very much larger figure.

The Chicago & North Western is, of course, one of the financially very strong roads of the United States. In 1915 a total of $8,185,000 was spent for additions and betterments to property, of which $4,769,000 was for equipment and the remainder for extensions, track elevation, buildings and betterment of roadway, etc. Notwithstanding this large additional investment in its property, the outstanding securities showed a net decrease of $4,298,000. The company sold $10,000,000 general mortgage 5 per cent bonds, due 1987, and redeemed $12,669,000 7 per cent bonds which matured February 1, 1915, and various other small issues. At the beginning of the year there was $19,459,000 cash on hand and at the end of the year $9,778,000. There were no accounts and bills payable, and total current liabilities amounted to $10,753,000 as against total current assets of $19,386,000, which included, of course, the cash mentioned above.

As was pointed out last week in the comments on the Chicago, Milwaukee & St. Paul's annual report, the crops in much of the territory reached by the North Western are far and away the



The Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha

which totaled $12,649,000 in 1915, or $290,000 more than in the previous year. A saving was made of $224,000 in repairs of locomotives, the total in 1915 being $4,111,000; but this was much more than offset by very largely increased charges for depreciation, $605,000 being charged for depreciation of locomotives, which is more by $122,000 than was charged in the previous year, and $1,360,000 for depreciation of freight cars, which is more by $436,000 than was charged in the previous year. The Interstate Commerce Commission's new rules for charging depreciation, under which the railroad company is ordered to charge a rate sufficient to extinguish the cost of equipment by the time it is retired, were in effect in 1915. The balance to the credit of the equipment reserve accounts at the beginning of the year was $6,089,000 and at the end of the year, after debits for accrued depreciation on equipment retired, a credit of $8,149,000. This is not a large amount compared with a road which has been very liberal in its depreciation charges, as, for instance, the Atchison, Topeka & Santa Fe, which at the end of 1915 had $23,953,000 reserved for accrued depreciation. The Santa Fe, of course, operates 11,136 miles of road as against the North Western's 8,108. If the present policy, however, best that have ever been harvested and the outlook, therefore, for the present year is particularly good. The purchase by the North Western of 40 locomotives and 5,000 freight cars puts it in a good position to take advantage of increased traffic.

The following table shows the principal figures for operation in 1915 compared with 1914:

	1915	1914
Average mileage operated	8,108	8,071
Freight revenue	$51,923,861	$53,989,475
Passenger revenue	20,528,443	21,540,543
Total operating revenues	80,779,675	84,559,335
Maintenance of way and structures	10,450,739	12,213,095
Maintenance of equipment	12,648,935	12,358,488
Traffic expenses	1,288,448	1,331,856
Transportation expenses	29,753,444	31,949,238
Miscellaneous expenses	604,058	665,516
General expenses	1,764,487	1,783,383
Transportation for investment—Cr.	138,539	.....
Total operating expenses	56,371,573	60,301,575
Taxes	4,516,943	4,252,790
Operating income	19,883,905	20,004,969
Gross income	22,683,904	23,245,927
Net income	11,914,049	12,306,142
Sinking funds	204,054	200,473
Dividends	10,899,615	10,899,615
Surplus	810,380	1,206,055

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA

THE Chicago, St. Paul, Minneapolis & Omaha operates 1,753 miles of road. It is a subsidiary of the Chicago & North Western, and the operation of the two properties is in close harmony. The Omaha forms a natural part of the North Western system, providing feeder and main lines in Wisconsin, Minnesota, and extending down into the corner formed by Iowa, South Dakota and Nebraska.

The Chicago, St. Paul, Minneapolis & Omaha is a granger road with the greater part of its freight traffic such as would originate or be destined for an agricultural country. It has very little heavy loading traffic and little that can move in through full tonnage train loads. It is highly competitive territory where it is often necessary to give frequent freight service to get the business.

Total operating revenues in 1915 amounted to $17,841,000, a decrease of $369,000 as compared with the previous year; but, unlike the North Western, all of this increase was accounted for by a falling off in passenger revenues, total freight revenue amounting to $11,523,000, or $96,000 more than in the previous year. Operating expenses amounted to $12,108,000, a decrease of $727,000 as compared with the previous year. Rental payments and interest charges were somewhat higher, as were also taxes, so that the net available for dividends amounted to $2,219,000, an increase of $197,000 over the previous year. The company paid 7 per cent dividends on both its preferred and common stock, calling for $2,087,000.

The saving in expenses was very largely made through smaller expenditures for maintenance of way, the total in 1915 being $1,957,000, or $670,000 less than in the previous year. There was $229,000 spent for ties, or a little less than half as much as was spent in the previous year, and smaller expenditures for bridges, trestles and culverts, and roadway maintenance and track laying.

Transportation expenses cost $6,738,000, or $195,000 less than in the previous year. The ton mileage of revenue freight totaled 1,336,000,000, an increase compared with the previous year of 3.24 per cent, and the number of passengers carried totaled 4,768,000, a decrease of 2.34 per cent. Passengers carried one mile decreased by 5.39 per cent, the average passenger journey being but 52.92 miles as against 54.63 miles in the previous year. Like the North Western, the Omaha showed a lower ton-mile rate and passenger-mile rate, due in part, of course, to the Minnesota rate decision. The average ton-mile rate in 1915 was 8.6 mills as against 8.8 mills in the previous year, and the passenger-mile rate was 1.975 cents as against 2.031 cents in the previous year.

Like the North Western, the Omaha made a substantial gain in its trainloading, the total trainload in 1915 being 360 tons as against a trainload of 331 tons in 1914, an increase of 8.91 per cent. There was no change in the amount of stock or bonds outstanding during the year and $565,000 was spent for additions and betterments, against which, however, was charged the original cost of equipment retired, leaving a net expenditure on property account of $73,000.

The following table shows the principal figures for operation in 1915 compared with 1914:

	1915	1914
Average mileage operated	1,753	1,748
Freight revenue	$11,523,103	$11,427,563
Passenger revenue	4,983,700	5,415,710
Total operating revenues	17,841,348	18,210,083
Maintenance of way and structures	1,956,803	2,627,189
Maintenance of equipment	2,476,957	2,303,125
Traffic expenses	344,363	357,570
Transportation expenses	6,737,697	6,932,903
Miscellaneous expenses	178,411	182,462
General expenses	433,205	431,169
Transportation for investment—Cr.	19,839	.....
Total operating expenses	12,107,598	12,834,117
Taxes	1,015,029	972,283
Operating income	4,713,887	4,702,684
Gross income	5,069,382	4,762,508
Net income	2,219,085	2,021,615
Dividends	2,086,910	2,086,910
Surplus	132,175	*65,295

* Deficit.

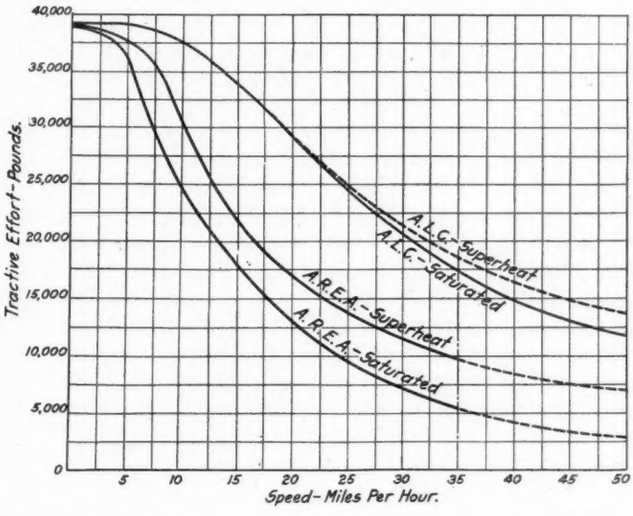
Letters to the Editor

SUPFRHEATER LOCOMOTIVES AND GRADE REVISION

CHELSEA, Mass.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In your issue of September 10, 1915, page 469, there appears an article on "Superheater Locomotives and Grade Revision." The author has presented a very interesting summary on the effect of superheating the steam in present saturated steam locomotives and its bearing on the question of grade revision. However, the basis of the computations and the results therefrom are so unusual that to the practical man who is in close touch with locomotive performance and the effect of superheated steam, the figures as presented serve to open the question of doubt, with a result of making the conclusions of the author of the article questionable. The method adopted by the American Railway Engineering Association and published in its Manual for 1911, was used for calculating the drawbar-pull of



Tractive Effort Curves for Typical Locomotives on Basis of A. R E. A. and American Locomotive Company Formulas

the assumed locomotive. The locomotive is of Consolidation type, with the following principal characteristics:

Grate area, sq. ft.	50
Heating surface, sq. ft.	3,318
Diameter of drivers, ins.	63
Steam pressure, lb. per sq. in.	200
Coal consumption (while working steam) per hr., lb.	4,000
Coal, B. t. u. value	11,000
Cylinders, in.	22 x 30
Wt. of locomotive and tender in working order, lb.	344,000

The author also assumes that train resistance in pounds per train remains constant between the speeds of 4 and 30 m. p. h., i. e., that a 32.5 ton car will have a true train resistance of 5.4 lb. per ton at speeds of 4 to 30 m. p. h. As a matter of fact, very few support this theory, as compared with the more accepted one that resistance increases with speed for the same car weight, i. e., the resistance for a 32.5 ton car at 30 m. p. h. should be about 50 per cent greater than the resistance at 5 m. p .h.

In the chart shown herewith there are drawn four locomotive tractive effort curves. The two curves marked "A.R.E.A." were plotted direct from the calculations presented for saturated and superheater locomotives in the article to which reference has been made. The two curves marked "A.L.C." are plotted from calculations which resulted from using the method suggested by the American Locomotive Company. From inspection of these curves it is evident that there is a wide divergence in the

basic theories for determining tractive effort at a speed of say 35 m. p. h., also that the difference in tractive effort due to superheating varies. According to the A.R.E.A. calculations for tractive effort at a speed of 5 m. p. h., the gain in tractive effort due to superheating is 3,966 lb. or 11.8 per cent. At a speed of 8 m. p. h. the increase in tractive effort, due to superheating is 8,452 lb., or 29.9 per cent. If this is so, why is it in actual practice under comparable conditions impossible to get a superheater locomotive to haul more tons up a five-mile grade, where sustained maximum tractive effort and a speed of 5 m. p. h. is required? It is true that differences instead of totals are dealt with here, but it was on this basis that the computations were made as presented in the article referred to. Adding to this an increased fuel economy of 35 per cent, due to application of brick arch and superheater, the steam locomotive would represent itself as the most efficient power plant.

At a speed of 35 m. p. h., the "A.R.E.A." curve gives an increase in tractive effort due to superheating of 73.3 per cent, while the "A.L.C." curve gives an increase of only 6.5 per cent. It is evident there is a wide variation in the theoretical results obtained from superheating. At this speed the "A.R.E.A." curve for tractive effort for a saturated steam locomotive shows 5,672 lb. From a practical point of view such figures will not substantiate service requirements. By allowing 91 tons weight on drivers, 12 tons on the truck and 70 tons for weight of tender of the assumed locomotive the resistances at 35 m. p. h. would be:

Machine friction	at 22.2 lb. per ton		2,020 lb.
Truck friction	at 8.0 lb. per ton		96 lb.
Tender friction	at 8.0 lb. per ton		560 lb.
Atmospheric friction	at $\frac{V^2}{3}$ lb. per ton		408 lb.
		Total	3,084 lb

This leaves 5,672 — 3,084 = 2,588 lb. tractive effort available on level tangent track. This available drawbar-pull would handle 323 tons at 32.5 tons per car, or approximately 10 cars. Now in all fairness is it not ridiculous to think a large consolidation type saturated steam locomotive of 39,000 lb. tractive effort is only capable of handling 323 tons at a speed of 35 m. p. h. on level tangent track? It might be well to recall the action of comparable freight locomotives, when, due to a passenger engine failure, their service was required at the head of a passenger train whose schedule speed required higher running speeds than 35 m. p. h. Also in the case of time freight trains, do such theoretical calculations bear out practical service runs?

To answer such questions I will call on the man who constantly is in touch with the actual operation of steam locomotives, both saturated and superheated in every-day service.

M. E.

FACTOR OF ADHESION

SCRANTON, PA.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In your issue of June 25 last a letter of mine comments on a previous article by E. F. Givin on the above subject, in which he makes a plea for the locomotive with a low factor of adhesion. Again on page 454 of your issue of September 15, in an interesting contribution, he presents his case more in detail.

My contention was that as conditions naturally varied, not only with each road and each division, but with each subdivision of service, that when practical the power should be specialized to meet a particular set of conditions.

Among other variable factors, that of adhesion holds a place of some importance. It seems to me, however, that it is not vital, as is for instance boiler capacity, and should not be permitted, more than a score of other debatable points, to unduly influence design. A profound respect for all these important, and often conflicting requirements, suggests caution in a final pronouncement.

In the example cited by Mr. Givin, in your issue of September 10, I am unable to reach his ultimate conclusion. Let us analyze this case. Briefly, he contends that, of two units, alike in all respects except in tractive effort, the one with the lower factor of adhesion (four) would handle increased tonnage over the sister engine with a factor of five, in practically inverse ratio of the factors. Or to put it in another way, the tonnage rating is based on tractive effort, which in the engine of low adhesion is 25 per cent in excess of its opponent. Immediately following is the statement that a locomotive can handle considerably more tonnage than it will start. I believe this latter is a generally accepted fact.

I concur, therefore, in the primary conclusion that, for certain service, say drag freight, starting ability is the factor that should determine tonnage rating. With modern power, built to usual proportions, this ability is determined by adhesion, and not by tractive effort. This is evidently where our opinions differ.

Given perfect rail conditions, and even admitting the liberal use of sand, it requires great skill to start full tonnage, without slipping, especially if working with superheat. Usual proportions include a factor of adhesion ranging from four to five, the ratios under discussion, and I believe there does not exist such an engine which is unable to slip its wheels under any rail conditions. This result is accentuated by careless handling. I believe that any experienced engineman will endorse these two last statements.

If this be admitted, and there seems to be abundant evidence to support it, we arrive at a practical condition, which discredits the theoretical data advanced in Mr. Givin's argument. This data may be correct too, as far as it goes, but like all such experimental information, must be accepted with some reservation, and used with judgment, and such modification as experience warrants.

For instance, the element of high temperature, probably lacking in the experiments which resulted in the factors submitted, is very much in evidence practically. Therefore, I conclude that the two machines under discussion would each start and handle the same tonnage, their ability in this direction being determined by the total weight on drivers and not by tractive effort. This would continue until a certain critical speed was attained, which might be higher for the engine of excess power, though it is probable that here the boiler capacity would be the determining factor. In any case the speed, if on the level, would probably be well over 50 m.p.h. for both. This is sufficient for the character of the service.

So far I have shown only equality for the engine of lower power. I now wish to present some points of superiority. If a locomotive cannot use its full tractive effort for starting a load, the excess is not only valueless for that purpose, but becomes an embarrassment. The human factor has to be given consideration. Not every engineer is equally skillful or even tempered, and many a train has been stalled by the engineman using poor judgment and losing his temper, when he could not "hold her down." The higher factor of adhesion gives an engineman increased confidence and coolness, and his ability to handle his train is improved in direct proportion.

Fluctuation in the tractive effort is a most important factor in determining the ability of a steam locomotive to hold the rail. In the common two-cylinder type this variation is reduced as the cut-off is advanced, resulting in a more even turning moment of adhesion, and it again scores.

In maintenance, the high factor engine, being comparatively free from the jars and strains, due to frequent slippage, will make a better showing in shop repairs and probably appear less frequently on the machinery failure sheets.

The larger cylinder volume and more frequent racing of the engine with excess power, mean increased steam consumption, while creating fire conditions that reduce boiler capacity and efficiency.

Many other minor reasons are available, but I believe those above are sufficient to defend the position I have taken on this subject.

GORDON BAXTER
Delaware, Lackawanna & Western.

How French Hospital Trains Help to Save the Wounded

The French Have Equipped 250 Trains and Perfected an Organization for Carrying Wounded to Hospitals

By Walter S. Hiatt

Our Special European Correspondent.

As the war goes on the railroad stands out more and more clearly as the inalienable servant of the warring armies. In the beginning it served in its normal capacity as a carrier of troops and supplies, as has already been told in these columns. It remains to be told how France has organized, reorganized, and now perfected, an intricate hospital train service, about which revolves every other service for the wounded. If the lives of more soldiers have not been lost, if the predicted epidemic of disease, say of cholera, has not raged in the trench country and back into France—and I have the word of Dr. Alexis Carrel, of the Rockefeller Auxiliary Hospital at Compeigne for it—it has been due to the careful and rapid transportation of troops all this past summer. Be it understood that the greatest enemy of the wounded soldier is not the bullet or shell, but the infection which sets in as soon as he is wounded, the bullet or shell having carried into the flesh soiled pieces of his clothing. It then becomes a race against time and distance to get the man into a real hospital where his wound can be washed and disinfected. As now organized the staffs of the hospital trains undertake to wash the soldiers' wounds *en route* if necessary.

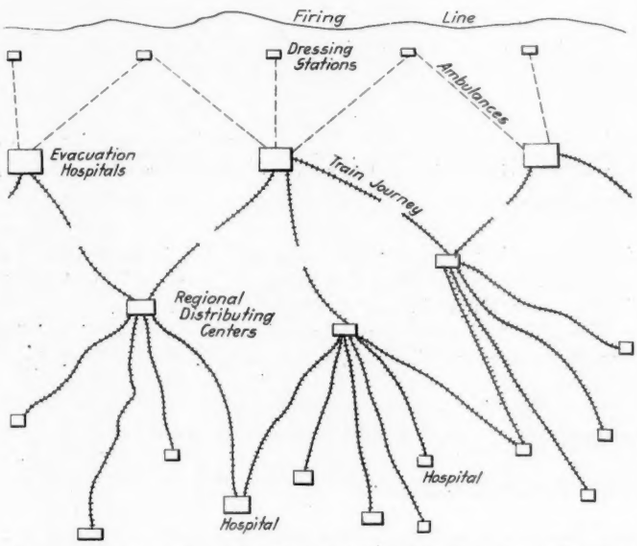


Diagram Showing How the Wounded Are Distributed to Hospitals in the Various Parts of France

Beginning before the war with seven hospital trains, kept almost for show, since nobody could foresee the need for hundreds of trains and thousands of specially equipped cars, sufficient to carry a half million wounded a month, there have been slowly prepared in France no less than 250 thoroughly equipped hospital trains, composed of 4,000 cars or one-thirteenth the total number of passenger cars used on all the roads of the United States. Each train is composed on an average of 16 cars which form an indivisable unit, carrying from 200 to 400 wounded, according as they are sit up or lie down. The total capacity of these 250 trains is about 100,000 wounded. It is estimated that to date, including German wounded, who are treated as well as the French, nearly 1,500,000 men have been carried from the front to the hospitals in France in these trains.

TRAINS LIKE HOSPITAL SHIPS

Each train is as perfectly organized as a hospital ship. Each has its number, each has red cross emblems painted on every car, each its selected set of officers and nurses who never leave it, each its allowance for supplies, its special equipment and its special duties. While the five different railroad companies continue to carry their accounts separately for commercial freight and passenger traffic, from the point of view of the war department they constitute a single immense company, every car and track of which is at the service of the government. Thus, every morning the seventh direction of the Minister of War receives by telegraph information as to the exact location of each of these trains and issues orders as to where they shall proceed.

The wonderful part about this service is the minimum of cost for operation. Although no less than $160,000,000 is being spent for the wounded this year by the seventh direction, $114,860,000 having already been spent for the first nine months of the year, aside from a sum equally as great spent by private charity, but a comparatively small part of this money has gone into the hospital trains. In large part the money has gone and is going for the supplies needed by the 15,000 physicians at the front or behind the lines, to purchase automobile ambulances, to buy stretchers and medicines, and to keep up the 800,000 beds for the wounded located in public and private hospitals, châteaux, homes, hotels, at the watering places, and, indeed, under almost every roof reared to the sky of sunny France.

The organization controlling these trains is particularly remarkable in that it was born of a necessity which no one but railroad men could understand until the past spring. Literally millions upon millions of men and women, mindful of their own loved ones, have been and are giving of their time and their money to the wounded. But while everybody could visualize the need for stretchers, for additional hospitals, or for motor ambulances for use on the battlefields, or to meet trains at interior railway stations, and to carry the wounded to the hospitals, but few could understand that it was a matter of life and death to fit trains properly for the carrying of the wounded during a brief 10 or 20 hours. So it was only this spring that there came any public realization of the need of organizing the work of the trains. The work that had been done had been carried on by a few railroad men and train surgeons clamoring for money from public or private sources. Finally they were understood and each city of France began to contribute money, then a few Americans contributed money, and now, with the service in good order, funds are available from other quarters.

A NEW FACTOR IN RAILROADING

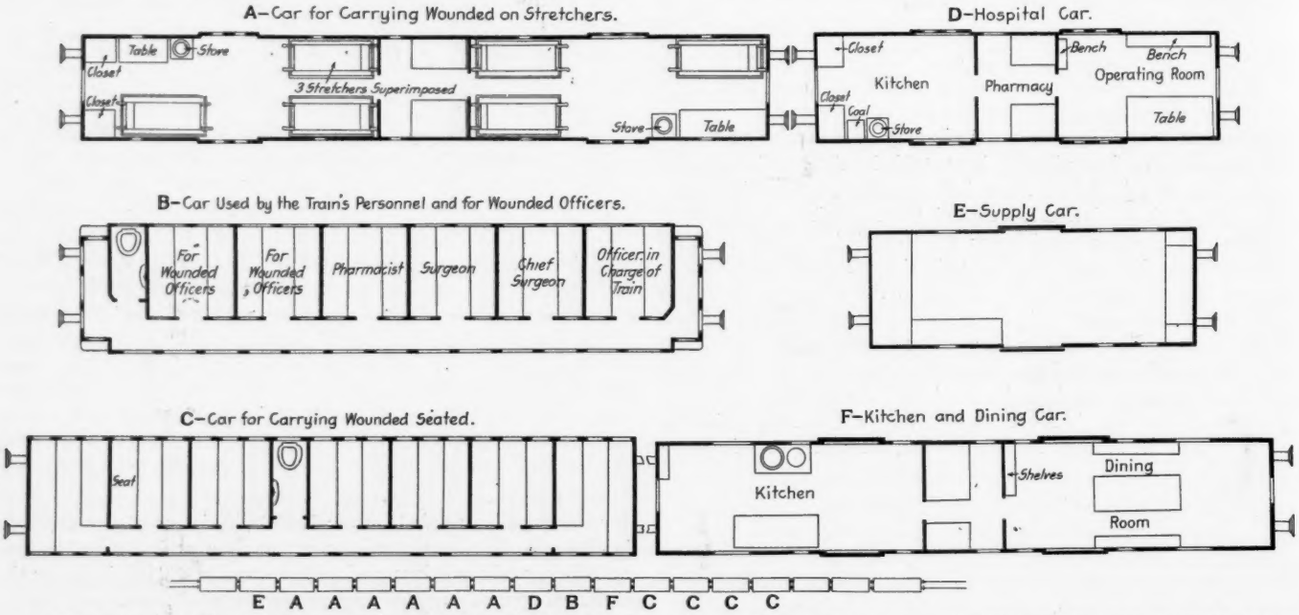
The hospital train on a large scale is really a new factor in railroading. Before this war and as early as 1889, M. de la Morandiere, an engineer of the old Western Railway of France, built some model cars which were shown at the French International Exposition. Later a few trains were built in Belgium and Switzerland primarily for the purpose of transporting sick people to the medicinal springs at Lourdes in the south of France. The cars on some of the Swiss trains, which have been used several times this year to transport exchanged French and German wounded home over neutral territory, may be compared to some of the tourist or emigrant sleeping cars found west of Chicago. They are corridor cars, with center aisles, and two rows of beds on either side, each bed having running water nearby. One of the curious features is a large mirror provided for each bed.

At the beginning of the war, by August 20, 1914, only the seven hospital trains mentioned above were in use. The half-million or so soldiers wounded during August, September, and early October of 1914, were lucky to get to any kind of a train,

though in the latter month no less than 600 had been improvised. If they were put on a train, it was composed of some of the 400,000 freight cars, hastily filled with straw or of the 35,000 passenger cars where the badly wounded at best had to lie on a cushioned seat. They were shoved therein and moved slowly to some hospital. Often they went for two or three days without water or nourishment or medical treatment. Many died from the jolting, even in the cushioned passenger cars where the jar was still too severe to be borne by the badly wounded.

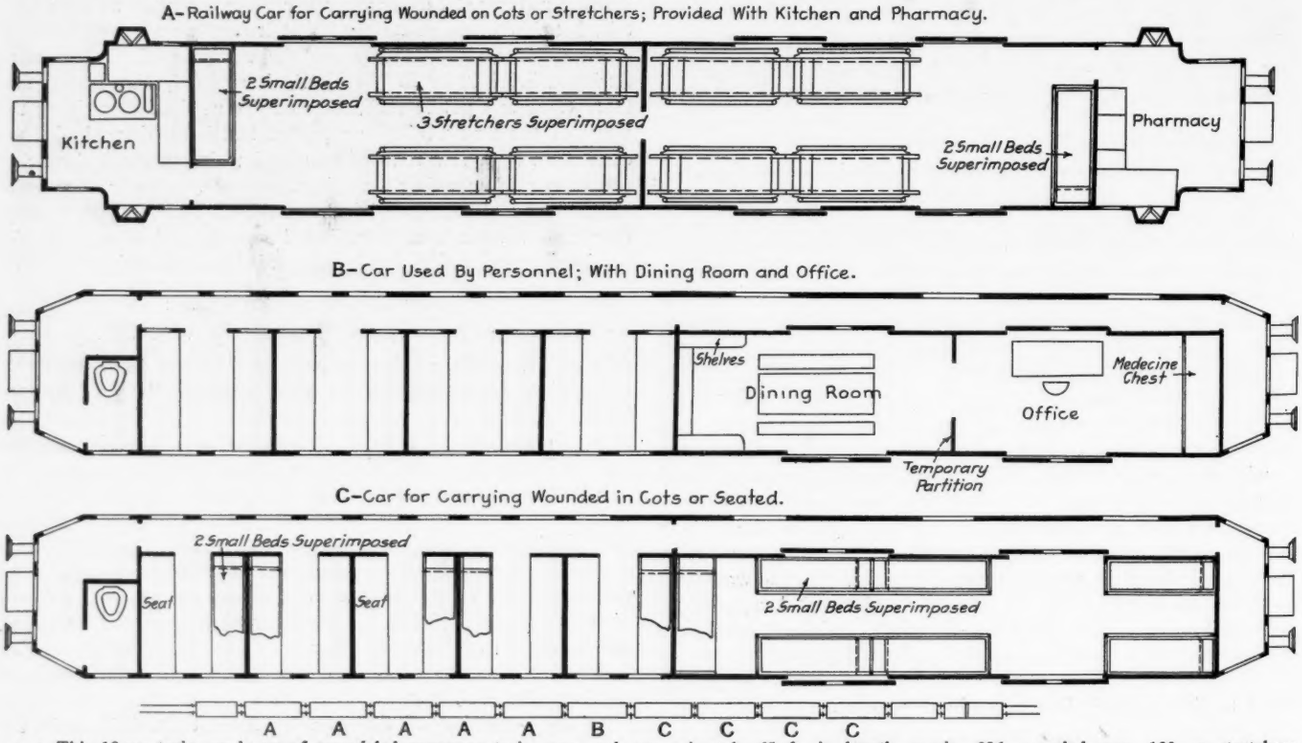
The conditions existing as late as October 1, 1914, were cited this August in the Chamber of Deputies, during an attack on the hospital service of the army, by a deputy who told how 1,400 wounded were sent into one of the 18 hospital regions of France when in this region there was no room for more. The train surgeons ran from village to village and from hospital to hospital, asking beds for the 1,400 wounded in their care, but were told everywhere that there were no more beds, and finally had to take the train into the neighboring region.

The period of these wandering trains of cars unequipped for carrying the wounded, however, has passed. Scientific study of



This train consists of 16 cars, the first car, designated C, being the second car behind the tender. It carries 296 wounded men, including 108 on stretchers in the six cars (18 to a car), designated A; 176 seated in the four cars designated C and 12 officers in Car B. Although it is not so designated in the plan, the first car of the train is probably for the nurses. A hospital car similar to the one here marked D was described in the issue of August 20.

Plan of a Typical French "Sanitary Train"


A—Railway Car for Carrying Wounded on Cots or Stretchers; Provided With Kitchen and Pharmacy.
Kitchen
2 Small Beds Superimposed
3 Stretchers Superimposed
2 Small Beds Superimposed
Pharmacy
B—Car Used By Personnel; With Dining Room and Office.
Shelves
Dining Room
Office
Medecine Chest
Temporary Partition
C—Car for Carrying Wounded in Cots or Seated.
2 Small Beds Superimposed
Seat
Seat
2 Small Beds Superimposed
A A A A A B C C C C

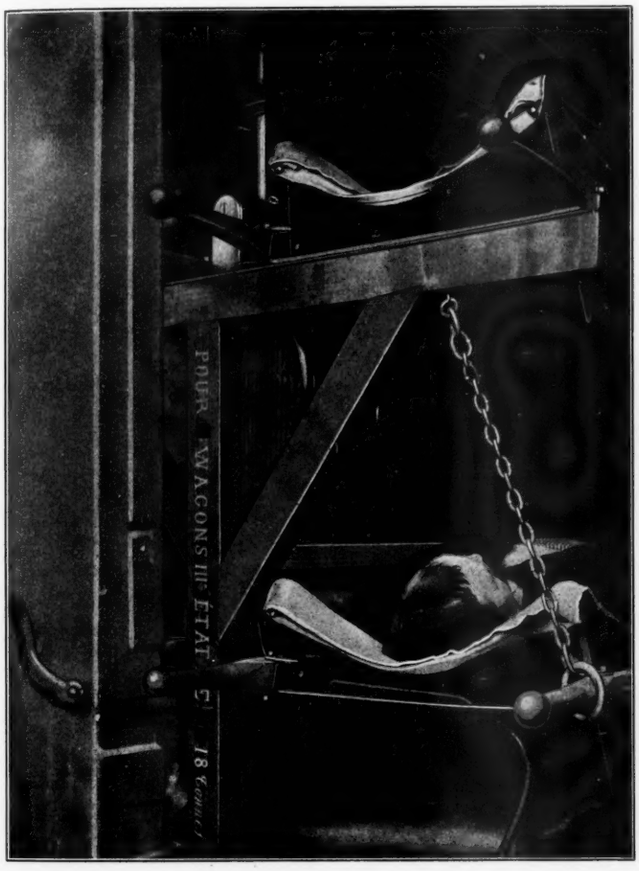
This 12-car train, made up of remodeled passenger train cars, each approximately 65 ft. in length, carries 296 wounded men, 120 on stretchers, 116 on beds and 60 seated. The five cars designated A each carry 24 on stretchers and 4 on beds; the four cars designated C each carry 24 on beds and 15 seated. The nurses' car is presumably the one immediately behind the tender.

Plan of a French Ambulance Train Improvised from Passenger Train Cars

the conditions has brought about mechanical improvements that are notable, considering the means at hand. One of these improvements, that of a train surgeon, Dr. H. L. Beltzer, will doubtless find world-wide application, because of the possibility of adapting it to any type of railroad car or field automobile.

DETAILS OF TRAIN ORGANIZATION

Through the courtesy of the Minister of War I was lately given an opportunity to see just how this service is organized on which the lives of so many thousands of wounded depend.

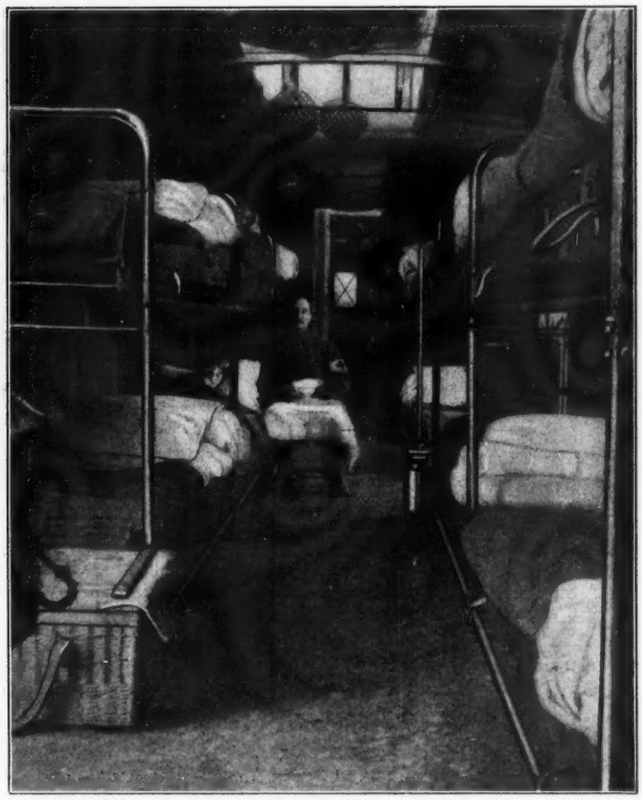


A Surgeon's Device for Carrying Wounded That Avoids Rebuilding Continental Passenger Cars

Before the wounded are finally distributed in the 18 hospital regions of France, they pass through several stages of handling. Beginning at the firing line, which is divided into 16 ambulance divisions for the entire French army and where each division makes its preparations for battle just as much as does an army general, the wounded men are gathered up by company, battalion, and regimental stretcher carriers and taken to a temporary field station, possibly not more than a mile from the trenches.

There they are placed in automobile ambulances according to the nature of their wounds, and directed toward a center for treatment or discharge, known as the hospital of evacuation. This ambulance transportation service is of the greatest importance. The automobiles work in groups of 11, but four of them being used primarily for carrying the wounded. Five are each fitted up for a special surgical use. One serves solely as a sterilization organ, carrying in it antiseptic washes and boilers for heating water. A second is used for radiographic purposes. In it photographs are taken showing the nature of the wounds, and a surgeon may immediately proceed to an operation, if the case is urgent. A third five-ton truck carries medicinal and surgical supplies, with electric searchlights large enough to light a tent or wagon where the surgeons are working. Two other heavy trucks are fitted to carry stretchers and coverings sufficient for 100 wounded. Another truck carries the camp equipment for the nurses, including their cooking utensils, and their supplies of cotton and bandages. This last truck also serves as a supply carrier for provisioning the other ten ambulances. There are no less than 60 men detailed to such a group, including a chief surgeon, 7 assistants, 26 nurses and 17 chauffeurs. Not a few of these Red Cross helpers are Americans, there being a total of 2,000 Americans helping all over France.

These motors discharge their wounded at a point behind the lines, known as the evacuation center. The wounded are here tagged according to the gravity of their condition, a white card for a slight wound, a red for a serious wound, and a blue for a wound of medium gravity. Each wounded man is provided with a paper stating his condition, his company, his name, and the place where he was wounded and is directed with his effects toward a general distribution railroad center. This intermediate transportation is made either by train, by automobile ambulance or by hospital canal boat, according to circumstances. There are 19 of these great railway distribution centers placed at intervals all over France, the total governed by nine divisional stations, which are in turn governed by the seventh direction of the Minister of War. The 19 distribution centers discharge their wounded in 18 regions, one or more centers to a region.



A Car in Permanent Train No. 5, Showing the Arrangement of Beds

The wounded arrive at these centers in one of three kinds of trains, permanent rolling hospitals, semi-permanent, or improvised. The permanent trains handle the badly wounded (grand blessés) exclusively, the semi-permanent the wounded which must lie down but are not yet considered in a very serious condition, and the improvised trains the wounded which are able to sit upright.

Arrived in one of the 18 regions, the wounded are then distributed according to their wounds in hospitals specially adapted for their treatment. The seriously wounded, say about the body, are sent to practically any general hospital, but those suffering from nervous shock, or eye wounds are generally directed to Paris, where the largest number of special hospitals are located.

Those soldiers who are suffering from typhoid fever, are likely to be sent to the watering places, like Vichy or Biarritz. This division of regions into centers of special treatment forms at once one of the most complicated and interesting details of the whole method of railroading the wounded.

THE HOSPITAL TRAIN AS A UNIT

There are special railroad experts detailed at the office of the seventh direction of the Minister of War who keep in touch with every hospital car and train in France, just as a chief train dispatcher does with his freight and passenger trains. Every morning these experts receive reports showing the position of trains unloading in the various regions and indicating the trains needed at the front. When a battle is being prepared at one or more points along the front, they make their preparations just as does the chief surgeon of the army corps involved. These railroad experts, taken from their ordinary duties with some one of the individual companies, know that an attack involving so and so many men means that they will have to provide so and so many trains at the evacuation hospitals to carry away the wounded. Hence there are always reserve trains on hand ready to carry the wounded back to life.

By special permission I was able to visit two of these re-

A Stretcher Frame Adapted for Use in Motor Ambulances or Freight Cars

serve trains, semi-permanent No. 22 and permanent No. 5. This latter train, in charge of Doctors Jacob and Paillard, had been in service nearly 14 months at the time I visited it. During that period it had carried 4,100 seriously wounded men and had lost but five of them. The train had just been disinfected by having its interior washed with alkaline water and *eau de javel,* and fumigated with sulphur smoke. The trench flies that had followed the train were driven away by a free use of cresyl. All trace of the wounded passengers had been removed and the beds were fresh and sweet as could be desired. The train consisted of 16 cars, several being of the corridor type, with connecting platforms, unlike the old type of French car. There were 256 beds in the eight cars of the train set aside for the wounded, these being placed on either side of the corridor. The hospital crew of the train consisted of 33 men, including a chief surgeon, an assistant surgeon, a provision officer, a sergeant and 28 nurses. Eight of the cars were used for hospital purposes, other than the transport of wounded. One of them, placed in the center of the eight transport cars, was a pharmacy and operating car, a freight car made over at the expense of W. B. Hardy, of Chicago. On its side, near the red cross emblem, was painted the American flag. At the end of the train trailed the car in which lived the 28 nurses. At the head, next the engine, there was a provision car, a short box car fitted up with closets for linen and blankets, and drawers for the storing of wine, sugar, rice, coffee, meats and vegetables. Behind it came a car for the surgeons and a kitchen car containing also space for the storing of dirty linen and cotton, this material having to be burned so infectious disease might not be spread.

A NOTABLE INVENTION FOR SHOCK PREVENTION

The visit to semi-permanent train No. 22 was of special interest, because there I was shown a new kind of hospital bed that is being adopted on the English and French hospital trains. The big obstacle to carrying the wounded soldiers comfortably has been the lack of the proper kind of beds. There are comparatively few sleeping cars and even these are too heavy for the carrying of large numbers of wounded. There were, however, large numbers of third class passenger cars of the corridor type. They were rather heavy, but the chief obstacle to their use was that they had to be cleared of their old transverse seats and provided instead with iron cots. One of the illustrations shows the installation of such cots in permanent train No. 5. All this took time, money and workmen; and these three elements were lacking. Besides this, there is a further objection in the case of the very badly wounded to the use of a sleeping car, or to the use of beds at all, because they have to be moved from their stretchers in order to be placed in the car and this not only may mean loss of time, but horrible suffering.

Dr. H. L. Beltzer, the surgeon in charge of train No. 22, last spring devised a frame support for stretchers which is about the simplest thing yet found for the transportation of wounded men either in ambulances or railroad cars. A view of one of these frames is shown herewith. In its simplest form the frame makes it possible to utilize any English or continental passenger car without a single change in the seating arrangement without injuring the car in any manner, and without installing in it a single bed. When the stretcher is placed in the frame, its handles are fitted into a set of iron rings, each held by a wrought iron spring, and these springs take up any kind of shock, whether up or down or backward or forwards. When the train arrives at its destination, there is no shifting of the wounded man, when he is loaded into an ambulance. The stretcher goes with him right to the hospital. In other words, the device means that a man can be carried from the battlefield to a hospital hundreds of miles away without a change of bed.

The device, with certain adaptions, also has the widest application for any kind of freight car. It could also be used in American cars. Dr. Beltzer showed me his operating car and one or two other cars which he had fitted up with a series of slightly different frames provided with strong springs and planted in the very center of the car, each frame supporting six stretchers, three stretchers to a side, the nurses having room to pass the frames on either side of the car. Dr. Beltzer has carried many wounded men in this manner, keeping them on their stretchers either from the battle field or the motor ambulances, and during the 10, 20 or 30 hours they have spent in the freight cars on the train, they felt no shock of any description. In some test cases he made at Havre for English hospital officers, he had engines bump the cars severely without disturbing the occupants of the frames.

Removal of Belgian Railways.—The Belgian Government has addressed to all neutral States a protest against the action of the Germans in removing the permanent way of Belgian railways. The Belgian Government points out that the decision of the German authorities will necessarily hamper the trade and business of a large part of the population, and protests energetically against this fresh violation of the laws and customs of war.

American Locomotive Builders and Foreign Trade

Manufacturers Must Be Allowed to Combine for Foreign Selling; Testimony Before Federal Trade Commission

By Waldon Fawcett

Railway equipment and supplies "Made in the U. S. of A." can continue to hold a place in the foreign market only if American manufacturers are allowed to combine for foreign selling. This, in substance, is the information given to the new Federal Trade Commission by leaders in the field of railroad outfitting. Moreover, contrary to the impression in some quarters, the situation with respect to American-made locomotives is represented to be much the same as with regard to rails, signal apparatus and shop machinery.

"We have done fairly well," said Charles M. Muchnic, vice-president of the American Locomotive Sales Corporation, in discussing the foreign sales of his concern, "but we cannot make much further progress unless we are allowed to co-operate." The same view has been advanced by other manufacturers of rails, rolling stock, etc., who have appeared in person before the new "supreme court of business," or have communicated their views in writing.

Waldo H. Marshall, president of the American Locomotive Company, was the witness who initiated, on the part of the Trade Commission, the new line of thought to the effect that American railway supply houses may need that same latitude with respect to "team work" abroad that seems essential in other lines. This aspect of the situation came as a revelation to the Federal body because several witnesses from other fields of industry had taken it upon themselves to say that whereas the Baldwin Locomotive Works and similar concerns might need no smoothing of the pathway of foreign selling, these leaders in the railway field were in a far more fortunate position than manufacturers in some other lines.

But even the American Locomotive Company finds limitations placed upon its selling campaigns, President Marshall pointed out. Said he: "Our company is a pretty fair sized one and we do carry sales expenses entirely for ourselves in certain parts of the world where we think the volume of business that we can obtain is going to be sufficient to justify that expense, but there are other parts of the world in which we would like to get some business and where we feel that we cannot afford to have our own representatives. The cost, year in and year out, would be far greater than any profits we would ever get on that business.

"Even with companies of our size, selling expense is quite a question at all times. We have had our own men at three different points in South America, besides agency connections and banking connections. In South Africa we cover the situation pretty well. In China, Japan, Korea, etc., we have our own men. But in other parts of the world, for instance in Australia, we would not think of having any representative direct from home. We get into some of those territories and feel that the only way in which we can afford to cover them at all is by some arrangement with a commission house, and we try to get a house that handles lines of goods that would make them more or less familiar with machinery so that they can represent us fairly well. But, after all, they are only transmitters, you might say, of information between the two parties because they do not understand locomotive construction enough to furnish any engineering information except as they may get it from us. Then there are other places where we cannot afford to pay any commissions at all—on any fixed basis plus a commission—and unless the party is willing to take it entirely on a commission basis we have to do without representation."

The purpose of the Federal Trade Commission in taking up, as the first work following the completion of its organization, this current investigation of foreign trade conditions is to ascertain whether there should be recommended to Congress at its next session the amendment of the Sherman and other anti-trust laws now on the statute books. The need for prompt consideration of the problems involved is realized by reason of the competitive conditions likely to prevail in almost all fields following the close of the present European war. As matters stand to-day American manufacturers of railway equipment and all other articles of commerce must face in every foreign mart a united opposition—that is, competitors banded together for the purpose of curtailing selling expenses and preventing reckless price cutting through bidding against one another. American firms have been deterred from joining hands to meet such competition through fear of the anti-trust laws which supposedly prohibit combinations of all kinds. The proposition then, that is before the newly-created Federal Trade Commission for recommendation to Congress, is whether the hampering laws should be so amended as to allow combinations of American manufacturers in the export trade through continuing to prohibit such pools or agreements in the domestic field.

While the locomotive builders are speaking two words for themselves before the Federal Commission in urging that joint selling agencies be sanctioned, they are incidentally saying one word for the smaller manufacturers in the field of railway equipment and supplies—the latter presumably being more seriously handicapped than the locomtive firms. Speaking of the need of permitting American manufacturers in the railway field to combine, Vice-President Muchnic said: "I believe that unless such permission is granted the small manufacturer will be unable to get his share of the foreign business. At the present time most of the exports in railway materials and iron and steel products are made by large manufacturers, and it seems to me that this in itself is convincing proof of the necessity of co-operation between manufacturers.

"The principal reason why the large manufacturer is able to command a large share of the export trade is because of the capital he commands and of the well-trained sales organization which it has taken years of persevering effort to develop. It is utterly impossible for the small manufacturer to command either the capital or such foreign sales organizations, and therefore, unless the situation, as it is at present, is changed, the small manufacturer will eventually be barred from participating in any part of the foreign trade."

Whereas the locomotive men have urged that they be given a free hand in making sales arrangements overseas they have, one and all, made it clear that joint selling to be effective must be allowable to the various firms in the railway field and not restricted to non-competing firms. "You might think," explained Mr. Marshall, "that if selling combinations are to be effective it would be very easy for manufacturers in different lines—perhaps that are non-competitive entirely—to choose a representative, and perhaps let him conduct the business for ten different concerns in a certain country, but that presents a very difficult situation for the reason that it is hard to get one man that knows enough about ten different lines of goods to represent them effectively and intelligently. The better way would be to allow those who are competitive at home, or who are very nearly competitive at home, to get together and in that way they can get representation that will be intelligent and efficient and cover their lines of goods thoroughly."

In answer to a question from one of the commissioners, the locomotive builder declared his belief that under such an arrangement there would be confidence on the part of the various participating concerns that each would get a square deal from the selling agent. "That is one reason," he explained, "why I

think the arrangement should be more or less voluntarily entered into, and my idea is that in most lines of trade they would not be necessarily large organizations. They would be of moderate size."

The Comite des Forges of France was cited to the Federal Trade Commission as, perhaps, an ideal example of co-operation between locomotive builders. The French combine was portrayed as fixing prices on the various types of locomotives and apportioning the aggregate orders in proportion to the output of the various plants. "After an experience of over ten years this arrangement has worked out entirely satisfactorily, as far as I know, to the government, the purchasers, and the manufacturers," said Mr. Muchnic in commenting on the French system. It is his idea that if such a plan could be established in the industry in the United States there would result "not a rivalry of prices among the manufacturers, but an effort on the part of each one to turn out a better product than his competitor."

In the capacity of compiler of facts for Congress the Federal Trade Commission has, this past few weeks, manifested an exceptional curiosity as to the status of the American export trade in locomotives and railway rolling stock, and in the nature and extent of the foreign competition encountered. Information supplied to the commission by the witnesses above quoted and others is to the effect that under normal conditions fully 90 per cent of the output of all locomotive shops in Great Britain goes to foreign countries, while in the case of Germany 50 to 60 per cent of the total production is shipped abroad, as compared with exports from the United States that represent 8 to 10 per cent of the total output. "So we have hardly touched the possibilities of the export trade as compared with the Europeans," commented one of the executives who appeared before the trade inquisitors.

When one of the commissioners asked whether British builders can turn out a locomotive more cheaply than can an American concern there was opened up an extended discussion of what were put forward by the practical locomotive men as the two main factors that to-day enter into the export trade in American locomotives and railway supplies. One of these is the circumstance that foreign trade in railway equipment will follow investments. The other is that the volume of our export trade will be, to a great extent, measured by our success in inducing foreigners to adopt American railroad standards. "Our principal work in developing our foreign business," explained Mr. Muchnic, "has been not so much in meeting the competition of foreign builders as to prevail upon foreign engineers to accept our types of locomotives."

To drive home his point he cited the situation in Argentina where he said fully 90 per cent of the railroads belong to British companies, and it is tacitly understood by the local engineers, as well as the London boards, that no foreign manufacturer will be allowed to supply equipment unless it is a question of urgent need and delivery. This situation in South America is reputed to cut American builders off from orders for 250 to 300 locomotives per year.

Many of the foreign orders for locomotives that have come to the United States were landed, the commissioners were told, because of the ability of firms here to make prompt delivery. Emphasis was also laid on the fact that present-day conditions with respect to the acceptance of American standard equipment on roads built and operated by foreign engineers, are but temporary—as temporary as the present European war. For instance, it is only because the foreign-built and foreign-managed roads in South American, China, India, etc., cannot now obtain equipment constructed to the English, French, German or Belgian standards, to which they have heretofore subscribed, that they are, for the time being, impelled to accept the American standard type of construction. But on the other hand there was cited the success of American equipment firms in securing repeat orders from the government-owned roads of Argentina and Brazil, and despite the fact that foreign standards are predominant on the neighboring privately-owned railroads where close relations exist between the consulting engineers and the supply houses.

"We must not only have American investments, but we must have American engineers to manage the railways in South America," declared one of the executives. "The prejudice of foreign engineers is indescribable. They look upon any product from any other country than their own as absolutely worthless." In illustration of the dangers of foreign influence there was cited the situation that has lately developed in Brazil on the railway system which Mr. Farquhar established some 10 or 12 years ago by the consolidation and development of a number of small railways partly owned by French, Belgian, English and Brazilian companies. With the inauguration of the new enterprise an American staff was installed and American manufacturers supplied all the rolling stock, but the continued adherence to American standards is represented to be now in jeopardy, owing to a change of management.

A concrete example of what American investments will do for American sales of railway equipment is to be found, the commission has been informed, in the situation on the Hukuang Railways of China, a system financed by four groups of bankers—American, French, English and German—with the result that an agreement was reached that in the purchase of equipment such as rails, bridges, cars and locomotives the standard of the country of a successful bidder is to be accepted. Heretofore, so the Trade Commission has been informed, American firms have supplied locomotives to practically all the Chinese railroads operated by the government and to roads dominated by Japanese engineers, but to none of the lines controlled by the British and Germans.

The extent to which German bankers have co-operated with German supply houses to beat American competition was brought out by the president of the American Locomotive Company, in explaining the need of better credit arrangements in the export field. Speaking of the experiences of his firm in the Latin-American field he said: "If we had to deal through a German bank we felt that practically everything that occurred in regard to our transaction which could be found out from the outside was known to our competitors. The amount of money that we were paid for our locomotives was known to that bank to the last dollar. If there were public tenders it might have been known anyway; but if there were private tenders they had the advantage of all that knowledge. They often knew all that we paid for freight, and everything of that kind, and we felt that at times we saw the evidence of that knowledge when it came to the next bidding."

Developing this aspect of the subject he said: "I do not believe that America's export business will ever be of satisfactory volume until the banking arrangements are such—the credits and so on—that our people will invest in foreign countries. In South America if English capital has gone to build railroads, then when the money came to be spent for new equipment it would naturally be spent at home. And we know of cases where they have paid higher prices at home—where they did it knowingly and openly to favor the home market—because the capital came from that country. That has given the English and German manufacturers large advantages in certain countries."

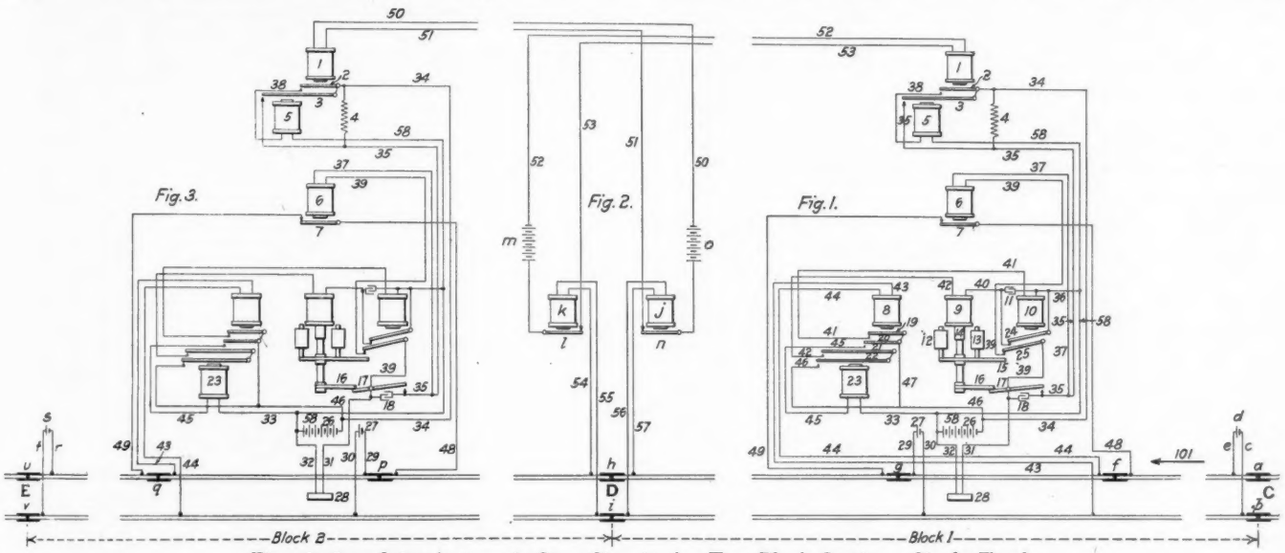
That the credit problem complicates, in the estimation of President Marshall, the whole selling proposition was disclosed when he remarked: "I do not think that the small concern can afford to send out a man of large enough caliber to represent them alone, intelligently, in the foreign field, for he not only must know his business as a salesman, as he would know it at home, but he must be big enough and broad enough, at the present moment, at least, to be depended upon to some considerable extent in regard to credits." Reverting later to this subject of selling railway equipment he commented: "The more intricate the manufactured article that is shipped abroad, the more necessity there is for intelligent representation of it in the foreign market."

RUSSIAN RAILWAYS AND THE WAR.—The Russian Minister of Ways of Communication is asking for extra credit amounting to about $2,400,000 to strengthen the railways owing to the war.

Cab Signals and Automatic Stops on the Western Pacific

Five Miles Block Signaled; No Disks, No Semaphores. Automatic Train Stops Controlled by Magnetic Induction

At Oroville, Cal., on the Western Pacific, 66 miles north of Sacramento, the National Safety Appliance Company, of San Francisco, has installed on five miles of the road, single track, an automatic block system which works wholly by audible and visual indications in the locomotive cab and by automatic train stops, no visual roadside signals being provided, except small light signals, one at each automatic stop location, called markers. These are for the information of any engineman who has been stopped. A red light indicates that the track magnet is still in condition to apply brakes, while green indicates that the section ahead has been cleared and that the train can proceed. Twenty locomotives have been equipped with the apparatus. The system works by magnetic induction. There are no moving parts on the roadway and none on the locomotive, other than relays, signal valves, and the air-pressure mechanism for applying brakes.



Figs. 1, 2 and 3—Automatic Stop Circuits for Two Block Sections, Single Track

A section of the road, about two miles long, is shown in Fig. 5. The letters G, Y and R indicate respectively the points at which green, yellow and red light indications are given in the cab. For example, a train moving west from B2 toward C1, C2 and so on, when the track beyond D4 is occupied, will receive a yellow indication at B_2, indicating caution; a red indication at C1, indicating stop, and, if these are not heeded, will have its brakes applied at C2. This leaves the distance from C2 to D4 in which to bring the train to a stop. If the track is clear, a green indication is given at B2, assuring a clear road to C2, and a green indication at C2 indicates clear through the next block. The de-energizing of the track relays provides also for giving caution and stop signals, and for automatic stop impulses to trains coming from the opposite direction.

The apparatus consists principally of "track magnets," fixed to the ties, and energized by roadside batteries "receiving coils," carried on the locomotive, and engine apparatus consisting of relays (four), storage battery, air valves for applying brakes and giving audible cab signals, and three electric lights. There is a registering apparatus which counts the operations of the automatic stop.

The track magnets are fixed between the rails, one to give the clear indication, one for caution, one for stop, and one for the train stop apparatus. The photograph, Fig. 9, shows a location where only three are required. On each side the magnet boxes clear the gage line of the track 10 inches, and midway between the rails there is a space of 8½ inches. Each magnet box is 6 inches wide. The receiving coils, on the locomotive, are fixed to a cross-bar attached to the rear end of the leading truck of the tender, as shown in Fig. 11. Each coil passes over its corresponding track magnet with a clearance of 3 inches.

Each track magnet is enclosed in a separate substantial water-tight metal box, and the receiving coils are equally well protected. The roadside batteries, for energizing the track magnet, controlled by the track circuit as in ordinary automatic block signaling, are of 10 volts capacity. The track magnets are normally de-energized, and are energized only when a locomotive approaches within 66 feet.

The proprietors have sent us the drawings, Figs. 1, 2, 3, 4, 6 and 7, with accompanying descriptive matter, from which we take the following:

Fig. 4 shows a track-magnet in place and directly over it a receiving coil (*a a*) connected in series with a relay (*b*) and a battery (*c*) and other engine-cab apparatus (*d, e, f, g, h, i, j, k, l*). The receiving coil and the coils of relay *b* are of relatively high resistance and use but .028 amp. current constant for each set. The relay magnets are powerful and the contact is not

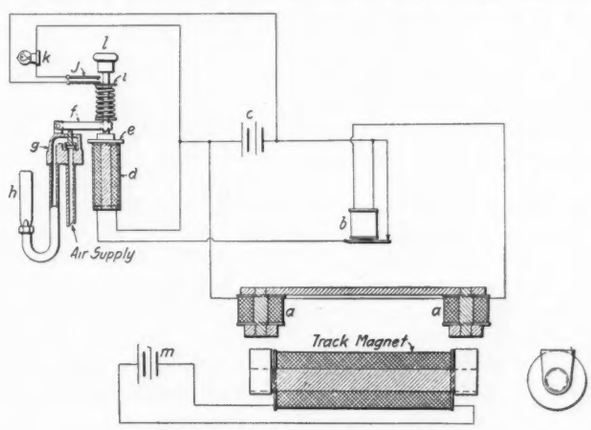


Fig. 4—Circuits on Locomotive

opened by engine vibrations. The current from battery *c* is not essential to perfect relay operation, but is used to give protection against the breaking or loosening of any wire or connection.

As the engine moves and the receiving coil passes through the field of the energized track-magnet, a current is generated in it which is more powerful than, and flows in opposite direction to, the current from battery *c* normally circulating in the receiving coil and relay. This induced current momentarily reverses the magnetism of relay *b*, permitting its armature to drop (though it is immediately re-attracted to normal position), opening the circuit to the cab apparatus. This interruption of the circuit de-energizes momentarily the iron-clad magnet *d*, causing the release of its armature *e*, which normally is held to the poles of the magnet. Lever *f* is then lifted by the air pressure from the engine main air reservoir, and the air unseats the valve and flows through the valve casing to pipe *g*, thus causing whistle *h* to blow. At the same time the disk *i*, attached to the armature stem, and rising with it, closes the contact at *j* and lights the lamp *k*. The armature of magnet *d* is now too far away to be attracted by the magnet, and is restored to normal position only when knob *l* is depressed. Pressing this knob opens contact *j*, thus cutting out the signal light, and it reseats the air valve. The engine has passed beyond the track magnet and armature *e* is held down by current from *b* and the supply of air is cut off from the signal whistle, stopping it.

The foregoing description applies to each of the three sets of apparatus provided for the operation of the regulation signals—clear, caution and stop—and each set consists of the apparatus described, namely, receiving coil, relay, electrically controlled air valve, signal whistle and colored lamp. A fourth set of the same apparatus, omitting the lamp, is provided to actuate the automatic stop and is operated in the same manner as described except that valve *g* is a vent instead of a supply valve. The alarm whistle of the automatic stop is located in the base of the automatic stop valve apparatus. When the automatic stop has been operated, pressure on knob *l* restores the vent valve to normal position, but the service application of brakes has been made and the brakes cannot be released until the train is stopped, when the engineman must get down on the ground and close a valve.

Provision is made for operating in either direction on the same track, the necessary reversal of the operation of the receiving coils, when an engine has been turned around, being provided for by a reversing switch.

The track magnet, Figs. 4 and 14, is fixed in a heavy case, 15⅞ in. long, 5 in. wide and 5 in. high (extreme height from ties 7 in.). The cover is flanged over sides and ends and is bolted down on water-tight gaskets. The leadout wires run through insulated water-tight stuffing boxes. The magnet requires an energizing circuit of 5 amperes at 10 volts. Normal operation takes current for 15 seconds only. Protection against loose brake-rods, etc., is afforded by a pine block 48 in. long, covered with a ¼ in. steel plate, as shown in the photograph, Fig. 9.

The locomotive receiving coil (Figs. 10 and 11) consists of two cores of Norway iron, wound in the form of a circular bobbin. The cores project through the bobbins and are fixed at the lower end to pole-faces. The projecting upper ends of cores are secured to a connecting iron bar. Connecting wires pass through a pipe attached to the lower parts of the coil cases. The coil cases are of cast brass and 4½ in. in diameter. The length over all of the encased apparatus is 18⅛ in., the distance between coil cases being 9½ in.

Four receiving coils form an engine set, one each for the clear, the caution, and the stop signals, and one for automatic stop operation. These receiving coils are arranged in pairs, bolted, pole-faces down, to an iron cross-bar (Fig. 11), which is supported by brackets extending back from the forward truck of the tender. Receiving coils will receive magnetic impulse from

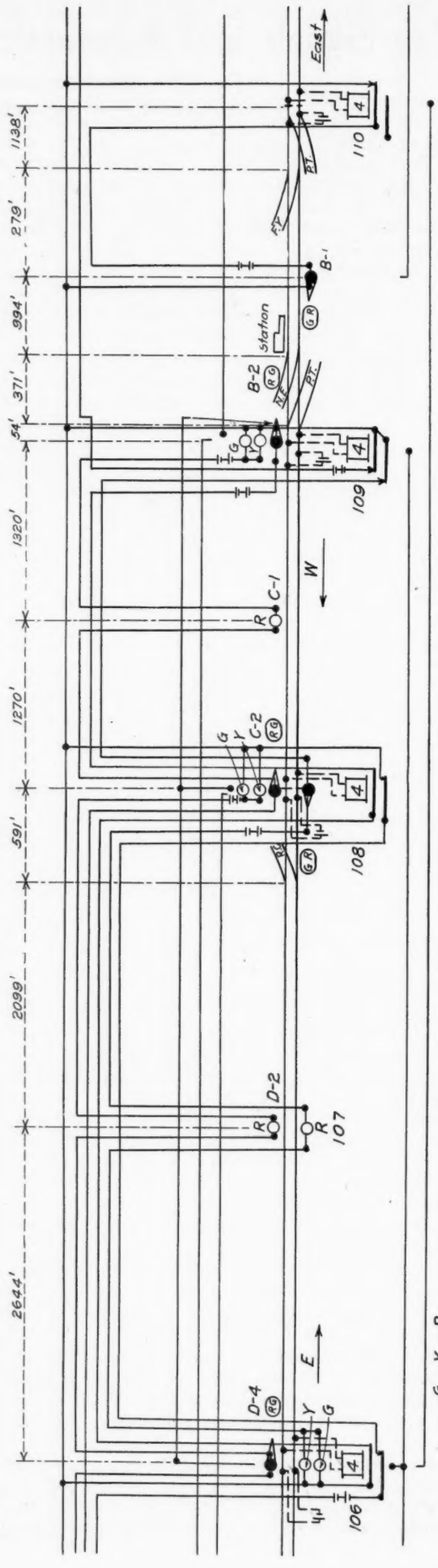


Fig. 5—Circuits for Cab Signals and Automatic Train Stops; Oroville, California, Western Pacific

their respective track-magnets even should they be 2 in. off centers. Wires from the receiving coils are connected through a substantial connecting plug to the iron relay box bolted to the side sill of the tender.

The air valves (Fig. 12 and *g* Fig. 4) are located in the engine cab with the restore knobs convenient to the engineman's hand. A locked and water-tight case contains these four valves, three for the signal lamps and whistles, and the fourth for the automatic stop. Each of the four valves has the connections, etc., indicated in Fig. 4, by the letters *d, e, f, g, h, i, j, k, l.*

The valve magnet is connected with the engine relay and with the 2-cell Edison storage battery of 2.5 v. and 125 ampere hours capacity, as shown in Fig. 4. Each valve takes a constant current of .25 amp.

The valve casing is 13¼ in. wide, 12 in. high and 5¼ in. thick. Height over all (case, knobs and whistles) 20¾ in.

Outside the lower right-hand corner of the valve case is a reversing switch. When the switch point is on one extreme end of the quadrant, connections are made for moving in one direction. The center is neutral, with current switched off, allowing valves to go to "danger." When the point is on the other end of quadrant, connections are made for moving in the opposite direction.

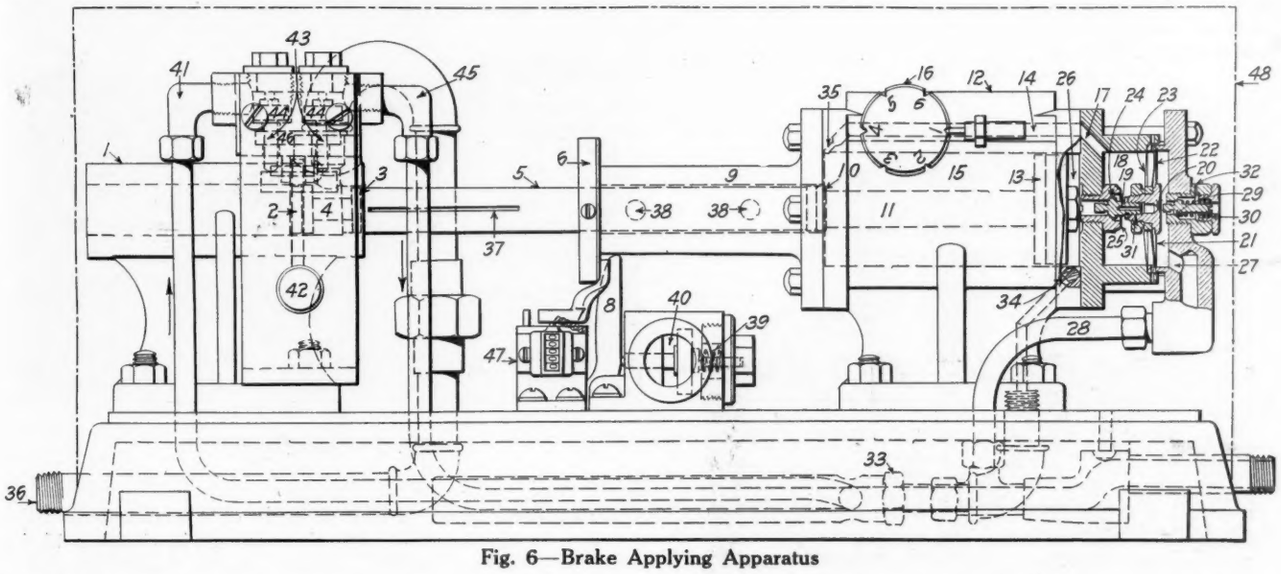


Fig. 6—Brake Applying Apparatus

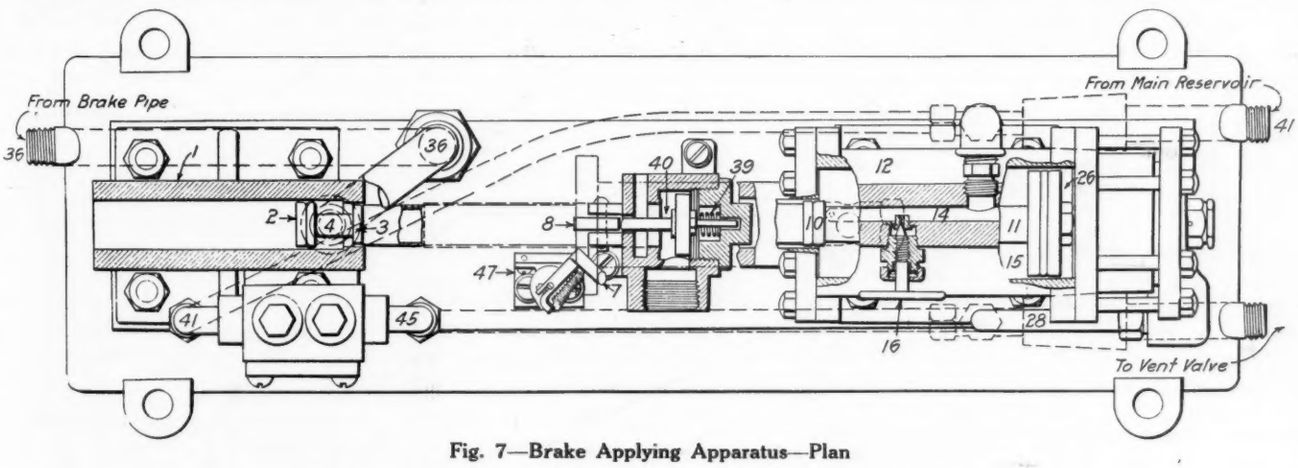


Fig. 7—Brake Applying Apparatus—Plan

THE AUTOMATIC TRAIN STOP

This is illustrated in Figs 6, 7 and 13. It is worked by compressed air. The connections are such that it applies the brakes only when stop signals have been disregarded, and it is designed to give only the regular service application of brakes, yet without preventing the engineman from giving an emergency application.

Description and Operation—The brake pipe is connected with application cylinder 1 by suitable pipe and fittings. In this cylinder a chamber is formed by the two piston heads 2 and 3, piston head 3 fitting into the small end of the cylinder, and both heads fitting airtight in normal position. Piston rod 4 is fastened with screw threads to both heads, and piston head 3 is fastened to application tube 5, each having the same diameter. Disk 6 is fastened to application tube 5 and bears against levers 7 and 8. Lever 7 is held against disk 6 by a spring which operates application counter 47 when disk 6 is moved from the normal position shown. Application tube 5 passes through cylinder 9 and is connected with piston head 10 by a loose joint which eliminates strain due to any unevenness of cylinders. Piston head 10 fits airtight for the entire length of its cylinder (9) and is fastened to piston rod 11, which passes through graduating cylinder 12. The other end of rod 11 is fastened to piston head 13, which fits airtight the entire length of cylinder 12. Main reservoir air pressure is connected by suitable pipe and fittings to the main air passage 14 in the upper part of graduating cylinder 12. The air in chamber 15, formed by piston heads 10 and 13, is supplied from passage 14 through restricted port 35, the air flow being regulated by application adjustment needle valve 16. The pressure in chamber 15, acting on the larger area of piston head 13, forces it to the extreme right or normal position, carrying with it piston head 10, of smaller diameter.

The diaphragm valve takes its supply from the main air pass-

age 14, through passage 17 into chamber 18, thence through passage 19 and restricted port 20, of fixed capacity, into chamber 21. As the air pressure builds up in chamber 21, diaphragm 22 is deflected toward chamber 18, carrying with it diaphragm 23, which is of smaller area than diaphragm 22. This causes valve 24 to close into seat 25, thus shutting off pressure from chamber 26. Air pressure in chamber 21 flows through passage 27 into controlling pipe 28, and thence by suitable pipe and fittings to the venting valve connected with the controlled air valve in the cab (Fig. 12).

The opening of the valve, when a stop is to be made, reduces

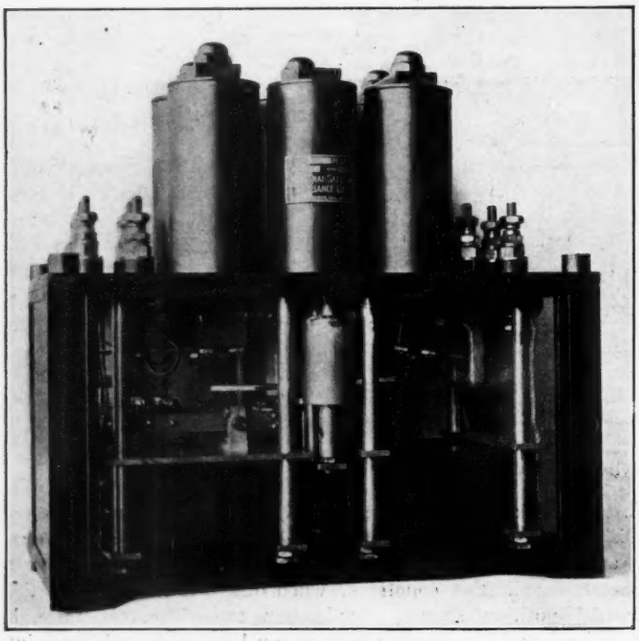


Fig. 8—Time Limit Relay
[See 8, 9 and 10, Fig. 1]

the pressure in chamber 21, causing the diaphragms to deflect toward chamber 21. The port 20 then closes into contact with valve stem 29, thus shutting off the supply from chamber 18 and forcing valve 29 against spring 30 until diaphragm stud 31 is in contact with the valve seat stud of valve 29. This controls the deflection of the diaphragms and the remaining pressure escapes to the atmosphere by valve 29 through port 32. All this results in unseating valve 24, allowing pressure to flow from passage 14 through 17, 18 and 24 (open) into chamber 26. This chamber is filled, and air escaping through restricted port 34 (of fixed capacity) causes whistle 33 to blow. The air

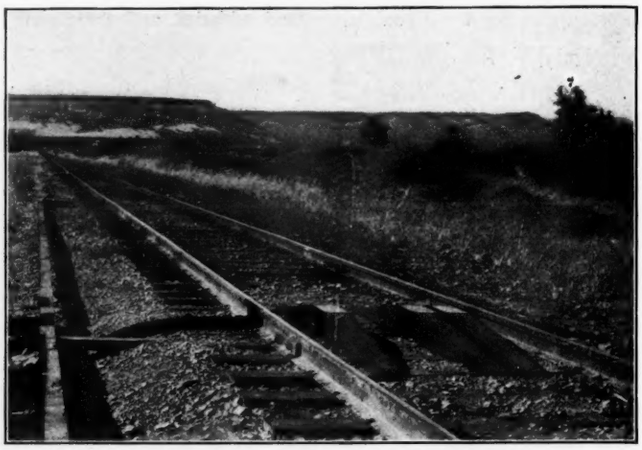


Fig. 9—Track Magnet

capacity of passage 34 is very much less than the capacity of valve 24, hence pressure is built up in chamber 26. When the pressure in chamber 26 equals the pressure in chamber 15, its superior force against the greater area of piston 13 causes piston 10 to move toward application cylinder 1. At the same time the pressure in chamber 15 is forced back through restricted passage 35. The speed of the movement of these pistons is regulated by application adjustment valve 16, which controls the flow of pressure forced from chamber 15.

The movement of piston 10 carries with it piston head 13, piston rod 11, application tube 5, with disk 6, piston head 3, piston rod 4, and piston head 2. This operation causes piston head 3 to travel with application tube 5 into the larger portion of cylinder 1, from which the brake-pipe pressure, entering at 36, passes into application cylinder 5, through slot 37, and thence exhausts to atmosphere through holes 38, which are normally covered, in cylinder 9. The speed of travel of application tube 5 and attached pistons is so regulated—by the

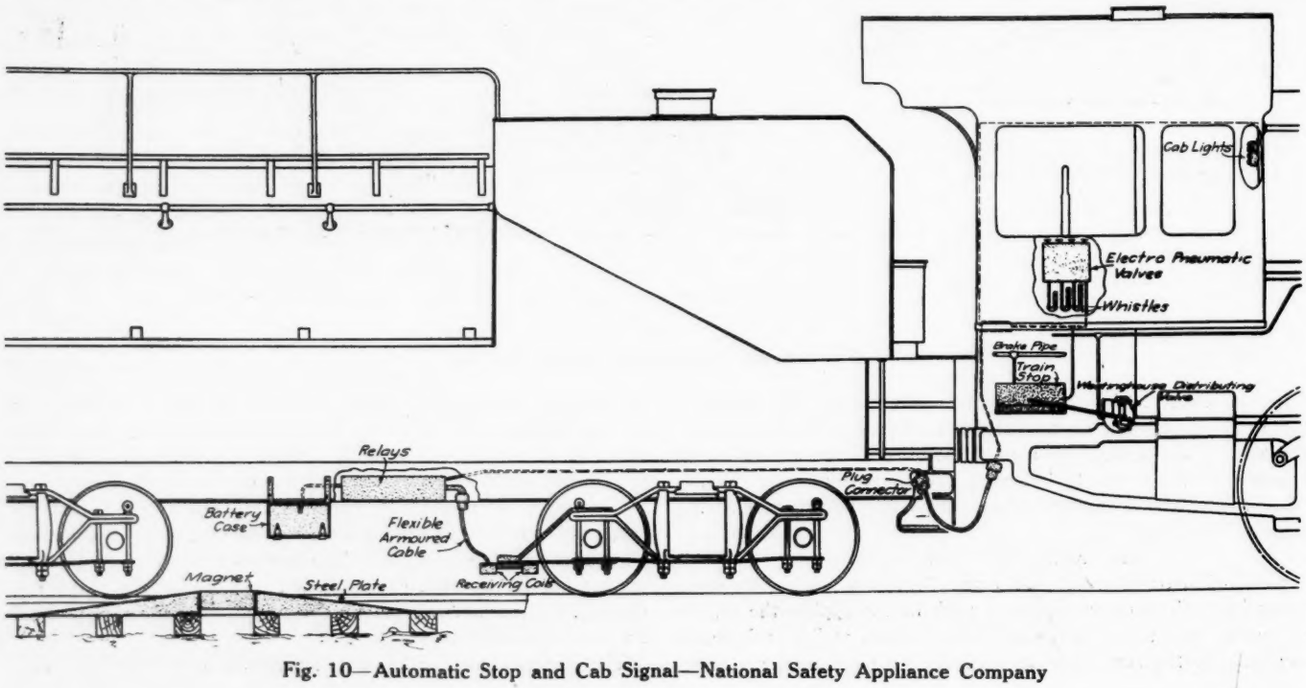


Fig. 10—Automatic Stop and Cab Signal—National Safety Appliance Company

adjustment of needle valve 16—as to reduce the brake-pipe pressure only to the extent requisite for a service application of brakes.

Valve 40 is connected by suitable pipe and fittings to the exhaust port of the engine distributing valve. When disk 6 moves, in company with tube 5, to which it is attached, lever 8 is released, permitting spring 39 to close valve 40, thus shutting off the distributing valve exhaust and preventing the engineman from releasing the brakes until the automatic stop mechanism is again restored to normal position. Restoration can be made only by first pressing the electric vent valve knob in the cab and then pushing release valve button 42 on the tandem or duplex valve, which button (42) can only be reached from the ground.

The tandem or duplex valve is back of the plate carrying its valve button 42 and is shown in dotted lines. This valve takes its air supply from the pipe supplying graduating cylinder 12, the air entering at 41. When release button 42 is pressed in, it raises valve stems 43, allowing the air entering at 41 to pass valve seats 44 and through chamber 46 to outlet 45, thence through connecting tubing to controlling pipe 28 and through passage 27 into chamber 21, there building pressure superior to the escapement to atmosphere through the small port 32. The increased pressure in chamber 21 causes diaphragms 22 and 23 to deflect toward chamber 18, increasing its pressure to the closing of valve 24, thus cutting off the supply of chamber 26 and so to whistle 33, which quickly exhausts the air pressure in chamber 26. Pressure in chamber 26 being exhausted, the pistons will move

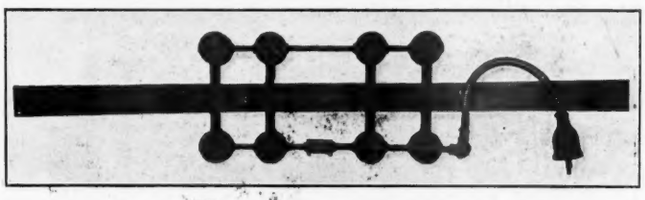


Fig. 11—Receiving Coils on Locomotive—Top View

back at once to their normal position, valve 40 reopened and the engineman can release the brakes and proceed, subject to the signal indication of the automatic roadside marker at each automatic stop location. Whenever a train is stopped by the operation of the automatic stop device, record is made by the automatic application counter 47.

The entire automatic stop mechanism is kept free from dirt by a tight cover, outlined by line 48. This is sealed.

When two or more locomotives are used in the same train, and the automatic stop is operative only on the leader, the standard double-heading cock under the brake valve (in the cab) is displaced by a three-port cock, one port of which controls the brake pipe pressure to the automatic brake valve, one the main reservoir pressure to the automatic stop, and the other the brake pipe pressure to the automatic stop. Hence, when this cock—normally sealed open to prevent wrong use—is closed on all locomotives except the leader, both the automatic brake valve and the automatic stop are cut out.

ROADSIDE APPARATUS

Figs. 3, 2 and 1 show the automatic stop circuits in the roadside apparatus of two complete blocks. The operation of the clear, caution and stop signals is controlled in exactly the same manner.

Block 1 is insulated from adjacent rail sections at *a, b, h, i.* Block 2 is insulated at *h, i, u, v.* At each signal location two more insulating joints are used, *f, g, p, q.* These joints do not break the main track circuit, which is shunted around them by wires 48 and 49 through contact lever 7 of protective relay 6. The disarrangement or failure of any of the apparatus, batteries or wiring, will cause this protective relay to drop its armature, thus opening the track circuit and causing the display of stop signals.

Block 1 is supplied with track battery at *d,* which through wires 56 and 57 energizes the track relay, Fig. 2, which, by means of line wires 50 and 51, controls line relay 1, Fig. 3.

Block 2 has its track battery at the far end, and through wires 54 and 55 controls track relay *k,* Fig. 2. This relay, by means of line wires 52 and 53, controls line relay 1, Fig. 1.

Suppose two trains from opposite directions enter the blocks, as shown, at the same instant. Relays *j* and *k,* Fig. 2, drop their armatures, causing the line relays 1, 1 in turn to open. Referring now to Fig. 1, line relay 1, opening, closes contacts 38 and 35. Armature 2, through wires 34 and 38, closes magnet 5 and locks armature 3 against contact 35.

The circuits just mentioned are now in condition to energize the train-stop track-magnet; but no further movement of any part takes place until the forward truck of the engine passes insulating joint *f,* assuming a train moving in the direction of arrow 101. At insulating joint *g* a local track battery 27 is connected to the rails by wires 29 and 30. Current from this battery is prevented from disturbing the main track circuit by insulating joints *f* and *g,* two rail lengths apart. At *f* wires 43 and 44 run

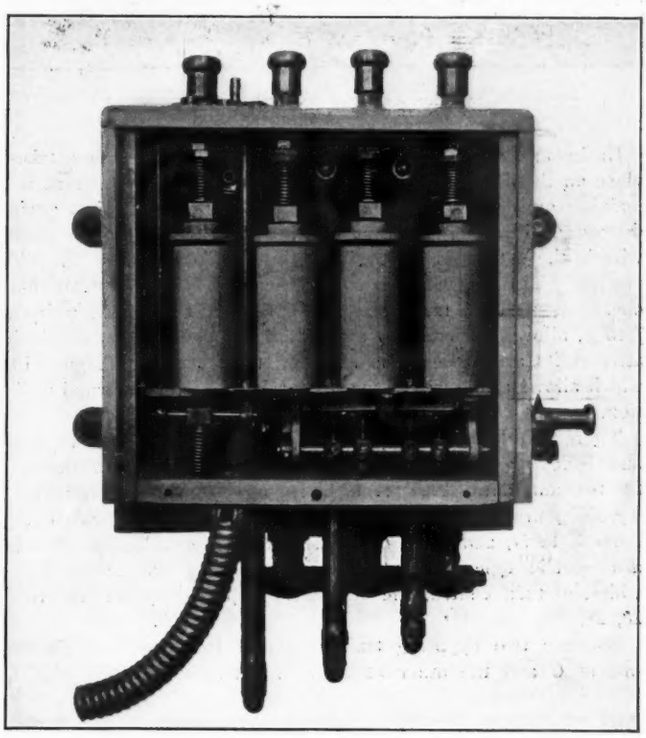


Fig. 12—Air Valves

to magnet 8 of the time limit relay and normally battery 27 holds up armatures 19, 20, 21 and 22 of relay 8, thus holding contacts 41, 42, 45 and 46 open. The forward truck of the engine, as it passes joint *f,* shunts magnet 8. Armature 20 is connected by wires 47 and 46 with one pole of battery 26, and when it drops it closes a circuit through wires 33 and 45 to magnet 23. The action of this magnet is to lock armatures 21 and 22 securely against contacts 42 and 46.

As armatures 21 and 22 drop, current travels from battery 26 through wire 46 to armature 22, thence to armature 21, thence through contact and wire 42 to solenoid 9, thence through wire 40 to armature 24, thence through wires 36 and 58 to the other pole of the battery. The action of this solenoid is to instantly draw up its core 14, to which is attached a frame connected to the pistons of two dashpots 12 and 13, and which also carries two projections 16 and 15. Arm 16 normally depresses lever 17; the action of 15 is to lift armatures 24 and 25 to a point where they can be retained by magnet 10, which cannot attract them from the distance at which they are normally set. As the core 14 reaches the end of its travel the circuit of solenoid 9 is broken by reason

of armature 24 being attracted and held by magnet 10, the circuit of 10 being closed through armature 19 and wires 47 and 46 to one pole of the battery and through wire 41, magnet 10, wires 36 and 58 to the other pole.

As the plunger 14 rises the projection 16 allows the right hand end of lever 17 to descend, closing the circuit to the track magnet 28. This circuit is through wire 32 from battery 26, thence through magnet and wire 31 to lever 17, to wire 35, to armature 3 of relay 1, thence by wire 34 to the other pole of the battery.

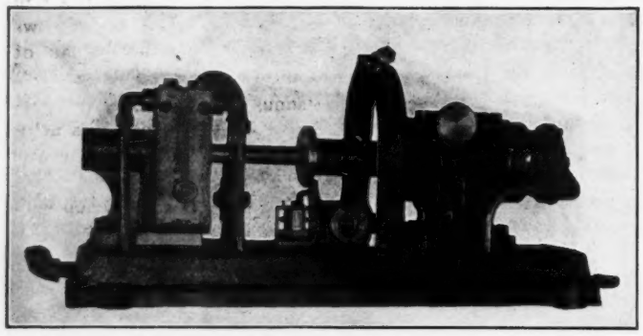


Fig. 13—Brake-Applying Apparatus

Dashpots are so arranged that their retarding action takes place on the downward movement of the plunger 14, current remaining on the track magnet until the projection 16 has again depressed the lever 17, thus opening the circuit of the track wire in the external circuit will produce the same result. Should magnet. The magnet box contacts cannot be set for another operation until the train has cleared the short rail section from *f* to *g*, allowing current to again pass through magnet 8, which attracts its armatures, thus breaking the circuit of magnet 10, which allows armatures 24 and 25 to return to their normal position.

To recapitulate, reading Figs. 3, 2 and 1, from right to left, and following the behavior of the relays in the operation of the two automatic stops arranged for opposing train movements, we note, first, that the track circuits are shown as extending from *C* to *D*, and from *D* to *E*. These circuits include standard neutral type relays *k* and *j*, controlling line relays 1, 1, which in turn control the automatic stop magnets on the ties, 28, 28.

Suppose two opposing trains entering the blocks as shown, one at *C* and the other at *E*: as the trains enter the blocks,

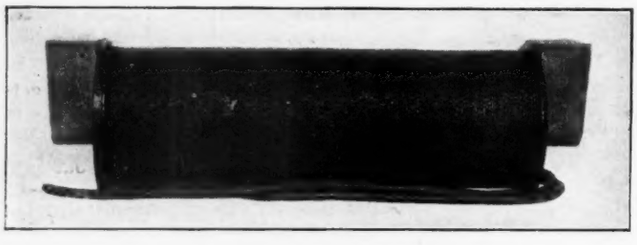


Fig. 14—Track Magnet

the track battery is shunted and relays *k* and *j* open, thus opening the circuits of line relays 1, 1. Thus the westbound train, moving in the direction of the arrow, 101, opens the circuit of battery *o*, Fig. 2, wires 50 and 51, and actuates the proper instruments to stop the eastbound train by application of the brakes at 28, Fig. 3; while the eastbound train protects itself against the westbound, in the same manner, by opening the circuit of battery *m*, Fig. 2. No further movement of the roadside instruments will take place until the forward truck of the engine—assuming that an engine from the east, moving in the direction of the arrow, 101, is the first to arrive—moves on to the short insulated section of track *f*, *g*. As soon as the engine enters this short section (the length of two rails), relay 9, Fig. 1, lifts 16 and allows the right hand end of lever 17, to drop and close the circuit to energize the track magnet 28, thus transmitting the impulse to the receiving device on the engine and setting in operation the aparatus for applying brakes. The eastbound train will be stopped in the same way, there being room for each train to be brought to rest before reaching *D*. The time-limit relays are so adjusted that they energize the track magnet 28, only for a sufficient time to communicate an impulse to the slowest train, after which they automatically cut out the track magnet until the train clears the insulated rail section, *f*, *g* (or *p*, *q*), upon which they reset themselves ready for the next operation.

The foregoing paragraph, it will be remembered, refers only to an automatic stop. In a complete system relay *j* might have other contacts, arranged to protect the westbound train from eastbound trains, farther back, by giving warnings at suitable distances; or to set stop-apparatus, or signaling apparatus, in its own rear.

The action of the protective relay 6 is as follows:

With the line and time-limit relays in their normal position, relay 6 is connected across the open contact between lever 17 and wire 35 by means of wire 39 to armature 25, thence by wire 39 to lever 17, thence by wire 31 to track magnet 28, thence by wire 32

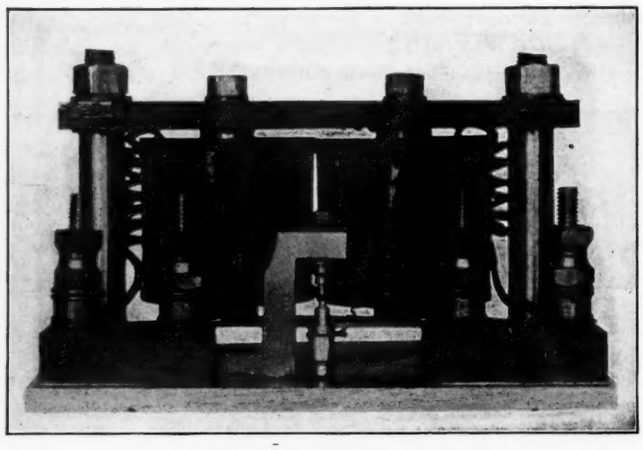


Fig. 15—Locomotive Relay

to one pole of battery 26. The other side of the circuit is from 6 by wire 37 to wire 35, thence to a high resistance 4 bridged across the terminals of armature 3 and contact 35, thence by wire 34 to the other pole of the battery. The relay 6 is of high resistance and the resistance connected in series with it at 4 reduces its operating current to an amount just sufficient to enable it to securely retain its armature 7. Any diminution of the voltage of the battery 26 below its normal safe operating point will weaken magnet 6, thus dropping armature 7, which will open the track circuit and set the proper stop signals. The breaking of any the track battery 27 or its connections 29 or 30 fail; or if wires 43 or 44 leading to magnet 8 should be broken (causing plunger 14 to be operated) then relay 6 will be cut out by the opening of the contact between armature 25 and wire 39. The opening of these contacts in the ordinary course of delivering a signal produces no effect, as the track circuit has already been opened by the entrance of a train into the block.

The condensers at 11 and 18 are connected across the contacts shown to dissipate the inductive spark occurring on breaking the circuit. Auxiliary carbon contacts (not shown) are also provided between lever 17 and contact 35 to further protect the contacts against sparking.

This system has been developed and installed by the National Safety Appliance Company, of San Francisco, as before stated; and the general arrangement, as well as most of the appliances, has been designed by W. S. Levin, chief engineer of that company.

Interstate Commerce Commission Hearing on Valuation

Railroads Urge the Commission to Co-operate with Them in Establishing Fundamental Principles to Be Used

On Thursday and Friday of last week the Interstate Commerce Commission heard oral argument on valuation matters conducted by Pierce Butler and other counsel for the President's Conference Committee of the railroads. The oral argument was based on a brief of 544 pages which the counsel had previously filed with the commission. There were a few members of the state commissions present, and Director Prouty, of the valuation work, was present. The commissioners, Director Prouty and Milo R. Maltbie, now employed by the commission, asked questions, but no witnesses were heard. The representatives of the state commissions, after the railroad companies' oral argument was completed, asked for ninety days in which to file a brief and also asked for a hearing at which they could present oral argument. The Interstate Commerce Commission gave them 60 days in which to file a brief, but did not set any date for oral argument.

The following is an abstract of the brief and oral argument presented by the railroads' counsel:

Under the act of Congress of March 1, 1913, the Interstate Commerce Commission is required to ascertain and report on the value of the constituent parts of the transportation system subject to the act to regulate commerce. This system comprises, roughly, 250,000 miles of line and with securities outstanding in the hands of the public totaling, approximately, $15,330,000,000. The act requires the railroads to co-operate with and aid the commission in the valuation.

REASONS FOR THE ENACTMENT OF THE VALUATION ACT

In the year following the creation of the Interstate Commerce Commission it urged the necessity for valuation, and in 1913, and again in later years urged Congress to pass an act which would require a valuation. Summarizing the various references in the Interstate Commerce Commission's annual report to valuation, the principal reasons which the commission advanced for urging it were:

(1) To obtain a trustworthy estimate of the relations existing between the present worth of railroad property and its cost to its proprietors.

(2) In determining whether rates as fixed by the government are confiscatory.

(3) In connection with railway taxation.

(4) In the ascertainment of a proper depreciation reserve.

(5) In testing the accuracy of the balance sheets of the carriers.

(6) As a help in the organization of railway statistics in general.

(7) In determining whether the railroads are under or over capitalized.

The Adamson bill contained in its title the words "physical valuation," but the body of the bill was not limited to the physical valuation, and the Senate struck out the word physical in the title when it amended the bill. The Senate committee reporting on the bill, said, "These terms [governing all elements of value attaching to the property of common carriers for rate-making purposes] accepted by recognized authority, are: (1) The original cost to date; (2) cost of reproduction new; (3) cost of reproduction less depreciation; (4) other values and elements of value, that is, intangible values.

COST OF REPRODUCTION NEW

In arriving at reproduction cost, the weight which the figures may have as evidence of *value* should not control or substantially affect the methods employed or the conceptions adopted for making the estimate. Reproduction estimates should be based on reasonable prices and present methods of doing the work. Everything now in existence except the road which is to be the subject of the investigation is to be assumed to be in existence in getting at this cost of reproduction new. The historical construction of the property or similar properties may be an aid in determining the present cost of reproduction insofar as it shows overhead costs, costs incidental to accidents, etc. A plan of engineering should be laid out exactly as if a new road were to be constructed. The procedure should be the same in making estimates of costs as would be the case if the work was actually to be done. Thus means of transportation other than the property of the railroad to be reproduced will be available and means of transportation over the railroad itself will develop with the progress of the work. Allowance must be made for the seasoning of a railroad property and where there is appreciation as in the case of roadbed such appreciation should be taken into account.

It is the cost of reproduction new of the identical and not of another or substituted stretch of road that is required by the law. Original records of grading quantities when corroborated furnish better evidence than present measurement. In determining the cost of reproduction new, there must be taken into consideration present or original conditions, ascertainment of grading quantities to be included in the reproduction inventory and the time required to reproduce the property. Furthermore, the form and manner in which the road shall be reproduced must be determined and the overhead charges estimated, these charges to include engineering contingencies, interest during construction, taxes and promotion organization and administration. Allowance must also be made for materials on hand and working capital.

THE DETERMINATION OF UNIT PRICES

The prices to be used in the valuation should be arrived at by a consideration of prevailing prices. Price tendencies and conditions affecting labor and material markets during a reasonable period of time next preceding and at the date as of which the valuation is to be made, should also be used, due consideration being given to the existence or non-existence of active railroad construction during the period. The importance of the subject of unit prices is so great and so many different elements enter into a proper consideration of it, some of which depend on local conditions and peculiar circumstances, that no prices ought to be applied even tentatively by the government valuation forces without the fullest consultation with representatives of the company whose property is to be valued. [Director Prouty stated that in the west so much difficulty had been experienced in getting an agreement between the forces of the commission and the railroad company that work along certain lines was being carried on and reports on it made by subordinates without submission of these reports of the railroad company's engineers. This method was very urgently objected to by counsel for the roads.]

APPRECIATION AND DEPRECIATION

Appreciation includes both seasoning and adaptation, and both of these should be taken into consideration. A newly built railroad has no greater length of life than an old railroad properly maintained. The only depreciation, therefore, which should be taken into consideration is that due to neglect of maintenance. The element of accrued depreciation, that is, the loss of service life in the simple properties of a railroad, the same being still in place and in useful serviceable condition, should not be considered as an element of depreciation, because, as has been demonstrated, this element does not affect the value of the rail-

road and the sole and only purpose of the valuation act is to ascertain the value. An attempt to estimate accrued depreciation is nothing but a guess and the result obtained is worthless. The amount of deferred maintenance, however, can be ascertained through personal inspection and the courts have held that in determining the cost of reproduction less depreciation, the only depreciation involved is that which actually exists at the time and which is capable of measurement; in other words, deferred maintenance.

A proper condition for economical operation should be determined for each piece of road and on the basis of this depreciation should be figured. In other words, if the estimated life of a rail is 15 years, no depreciation should be figured against rail which has been in track for five years so long as the railroad company is renewing each year the rails that need to be renewed and thus keeping its track up to the proper operating standard. Property should be inspected jointly by representatives of the valuation forces and of the railroad company and every reasonable effort made to agree, first, on the question of whether there is any deferred maintenance and, secondly, on the amount of it, if any. The only purpose of determining depreciation is to ascertain whether or not the value of the property has been preserved and only to the extent that it has not been preserved is there depreciation. Property should be classified as follows:

Items and groups of properties which appreciate.

Items for which cost of reproduction less depreciation and cost of reproduction new are the same.

Track.

Machinery, tools and equipment.

Remaining classes.

LAND

The same principle should be used in determining the value of land used for railroad purposes that is now used in condemnation proceedings. Railroad property is private property. The value that is required to be found is the entire value. It is not within the power of Congress to provide that any value or element of value shall be excluded from consideration in any case to which the provisions of the fifth and fourteenth amendments of the constitution apply for the protection of private property. It makes no difference how the railroad company came to acquire the land which it has so long, of course, as it acquired it legally. The value to be determined is the value which should be assigned if the property were to be taken under condemnation proceedings. There is a theory known as the trustee theory which assumes that there exists between the public and every railroad the relation of principal and agent, or of beneficiary and trustee. No such relation exists. The public does not owe a railroad the money that the latter has invested in its property, nor has it any legal or moral right to appropriate the rewards of success. The right to regulate the charges of those engaged in a public calling or to regulate the selling prices of commodities rests on the power of police and not on ownership, legal or equitable, of the property. Some of the advocates of the trustee theory frankly admit that the law is settled against them and they insist that the Supreme Court must reverse itself. Manifestly, the commission has no power either to reverse the court or amend the constitution.

The value of land for terminal purposes or for right of way cannot be determined without also taking into consideration the use for which it is to be put. The right of way of a railroad is more valuable than an equal acreage of land lying adjacent to it used for agricultural purposes.

[Commissioner Hall asked what would be the line of argument in a case where, when the railroad was built, the land was not under irrigation and was bought for $1.25 an acre. Later irrigation was introduced and the value of land for agricultural purposes increased to $100 an acre. Counsel for the railroads maintained that the value which should be taken was the value that would have to be taken if all other conditions were the same as they are now, except that the railroad was not there. In other words, that if a road were now to be built through this territory, the price which would have to be paid for land would be at least as high as its value for agricultural purposes. It was conceded, however, that there might be a conceivable case in which land for railroad purposes would be less valuable than for some other purposes, but it was argued that in this case the railroad would not be built and that, therefore, if a railroad was built it was evidence that the land for railroad purposes was more valuable, or at least as valuable, as the land for other purposes.]

It is the property and not the cost of it of which the owner may not be deprived without due process of law. The Minnesota cases do not condemn the reproduction method of valuing land when reasonably applied. The court condemned the particular method used in the Northern Pacific case, because of defects it found therein and which are specified in the opinion. The phrase "the fair average of the normal market value of land in the vicinity having a similar character," and again the phrase "the fair average market value of similar land in the vicinity without additions by the use of multipliers or others to cover hypothetical outlays" are not to be read to mean market value for general—not including railway—purposes. These phrases mean prices which the company would now have to pay to carve an equivalent right-of-way out of adjacent lands having a similar character and value.

A compilation was made by counsel for the railroads showing land acquired by railroads for building extensions, branch lines and double track, etc., in the last ten years and a general average was then made to compare the cost which the railroad company had to pay for land, for railroad purposes, with that which would have had to have been paid for the same land for other purposes. The price which would have had to have been paid for all the land for other purposes was approximately 40 per cent of the price which the railroad company had to pay. It is the experience of railroad companies in recent times which should be made the basis of the estimate as to how much more land is worth for railroad purposes than for other purposes.

[The question was asked as to whether, if the Pennsylvania Railroad did not exist today, it would not be very easy to obtain land grants, cheap right-of-way, etc., for the building of this road. Counsel for the railroads replied that it is impossible to go off into pure speculation, that the best answer to the question is to be found in the experience of railroads which are today building a new line, extensions or branches, and this experience shows that the railroad has to pay very considerably more than would some one who was acquiring the land for other purposes.]

"USED FOR PURPOSES OF A COMMON CARRIER"

The law broadly divides the property of a railroad into two classes, that which is for the company's purposes as a common carrier and that for purposes other than those of a common carrier. Furthermore, the second class includes both property owned and property used for purposes as a common carrier; thus the Armour Car Lines could not be valued under the law as the property of that company because the law applies only to common carriers and that company is not a common carrier. All property, therefore, used by an operating carrier, whether owned by it or not, must be included in the inventory of the operating carrier. All joint facilities should appear in the reproduction inventory of each carrier and in addition to the original cost, cost of reproduction new and cost of reproduction less depreciation, a full statement as to the ownership of the facilities, a full statement as to the use made of the facilities by each carrier using same, together with the rates and obligations in that regard, and a full statement as to whether carriers pay for the facilities and in what amounts, and the consideration for such payments should be shown. When all these facts are properly before the commission, then will be the time to formulate the rule for the determination and apportionment of such value.

ADDITIONS PAID FOR EARNINGS

All the property of the carrier, whether paid for out of cap-

ital or earnings, or whether received as a gift, is to be included in the value on which the carrier is entitled to return. The assumption that a surplus of earnings is prima facie evidence of unreasonable rates in the past, is wholly wrong. There is no necessity for the company to actually pay out in dividends surplus and then ask its stockholders to invest an amount equal to the dividend in the property to make the investment of surplus a new investment and an investment of property which belongs to the stockholder. The only equitable assumption is that the rates charged are reasonable and that the fact that a particular railroad company can earn a surplus is because it is economically located and operated, and that good business judgment has been used in its management. Additions and betterments made out of earnings or surplus are, of course, subject to taxation on the same principles and to the same extent as if they had been paid for out of capital, and the Supreme Court of Washington has specifically pointed out in a recent case that there cannot be one value for purposes of taxation and another value for the purpose of establishing reasonable rates.

OTHER VALUES AND ELEMENTS OF VALUE

The other elements of value which may be called the intangible values, but which nevertheless are as substantial and as real as any physical values, may be divided as between values which attach to specific pieces of property, units or parts of property and values which attach to the property as a whole. Each particular case must be studied to determine the value which attaches to specific pieces of property; thus if a railroad company owns a piece of right-of-way or terminal which renders all the service which the owning carrier can require therefrom, and in addition the owner receives a substantial revenue from some other railroad, this value should be taken into consideration.

There are five classes of values which attach to the property as a whole and can be valued together.

1. That element of value which results whenever the separate articles of physical property constituting a railroad are joined together, not simply by a unity of ownership, but in a unity of use.

2. Going concern value is that element of value, in addition to the sum of the values of its component parts, which results from the fact that the plant is in operation and has an established business—i. e., in active and successful operation earning revenue.

3. That element which represents the earning capacity of the property due to its favorable location with reference to command of traffic, including the existence of traffic producing industries along its lines, its advantage of connections with other carriers, the potential traffic in its tributary territory and all other features bearing upon its present and prospective traffic earning capacity.

4. That element of value resulting from economy of operation, due to gradient, alignment and other physical characteristics, climatic conditions, adequacy of terminals, equipment and other facilities, fuel supply, efficiency of operating organization and all other features bearing upon the cost of operation and maintenance.

5. That element of value represented by franchises and privileges.

Exports of Rails from the United Kingdom.—The exports of rails from the United Kingdom in August showed some increase as compared with the corresponding month of 1914, although they were not up to the level of August, 1913. The change observable was due, to some extent, to an increased colonial demand, the shipments to South Africa rising to 4,742 tons, as compared with 180 tons; those to Australia to 13,848 tons, as compared with 6,227 tons; and those to New Zealand to 2,314 tons, as compared with 1,070 tons. The deliveries to British India declined, however, to 3,595 tons, as compared with 8,303 tons.

THE GRETNA COLLISION

The disastrous collision on the Caledonian Railway at Quintinshill, May 22, last, when a train filled with troops ran at high speed into a local passenger train, was reported in the *Railway Age Gazette*, June 11, pages 1227 and 1242. The report of the Board of Trade inspector, Lieut. Col. E. Druitt, just at hand, gives the total casualties as 473 (227 killed and 246 injured), by far the largest record for a single train wreck that we can recall. The number of killed is 66 more than the number reported in June, but it includes 28 persons who at first were included in the list of injured. This total includes 82 bodies recovered but not recognizable because of the effects of the fire. The inspector expresses the hope that few if any of the persons fatally burned were conscious when the fire reached them. Of the total number of killed 215 were in the troop train, 7 in the express train which ran into the wreck a minute after the collision occurred, and 2 in the local passenger train. The number of employees killed was 3 and of injured 4.

Discussing the cause of the collision, the inspector recounts various things done or omitted which led up to the fatal error, or which were potentially dangerous; but he devotes his principal paragraph to the use of track circuits as safeguards against the giving of false clear signals at interlockings. But, he says, if a place like Quintinshill is to be fitted with track circuits, "it means that every signal box on a main line is to be fully provided with this device, on both tracks, between the home and starting signals; and Quintinshill would be one of the last places to be so fitted, for it is little more than a block post and all the tracks are in full view of the signalman."

The error of the signalman, in forgetting the presence, within a hundred feet of his window, of a standing passenger train, from which he had himself alighted a few minutes before, is, in view of the results, staggering. There was no question concerning incompetence, or liquor drinking or distraction by any unusual circumstance. There were two or three trainmen in the cabin but no nonsense or anything to disturb the signalman. There were some contradictions in the testimony, which the inspector could not clear up, but the main fact was not affected by them. Concluding his observations on this branch of the subject the inspector says:

"The means provided at the present time by the company for reminding signalmen of any vehicles standing within their control at such a place as Quintinshill should have been sufficient, if the signalmen concerned had only carried out the ordinary simple rules of block working and regulations laid down for the purpose, and paid proper attention to their duties. Also, it is much to be regretted that some signalmen do not look out of their signal-boxes to see if the line over which an approaching train is to run is clear of any obstacle before lowering the signals. It takes only a brief interval to do so, and many collisions could be prevented if this simple precaution was always taken. Had Tinsley looked along the up line on this occasion, he could not have helped seeing the 6:10 local train standing only a short distance away."

The inspector devotes a page to the fire, which, starting from coals spilled out of two or more fireboxes, became uncontrollable in a few minutes. There was no water supply available, even the tenders of the locomotives having been emptied by being ruptured in the collision. Fire engines from Carlisle, ten miles away, reached the scene *three hours* after the collision. The inspector repeats former recommendations that all passenger cars be lighted by electricity, at the same time saying that this fire was not due to the use of other illuminants.

German Steel Production.—The total German production of steel ingots and steel castings, including Luxemburg, in 1914, amounted to 14,973,106 tons, as against 18,949,929 tons in 1913. The figures for steel finished products, including rails, girders, sections, forgings, etc., were 13,011,438 tons in 1914, as against 16,518,950 tons in the preceding year.

Pennsylvania Track Elevation Through Wilkinsburg, Pa.

Five Tracks Are Being Raised Through Suburb East of Pittsburgh, Work Carried on Under Heavy Traffic

The Pennsylvania Railroad is now completing the elevation of its main line through Wilkinsburg, a suburb of Pittsburgh, work which has been carried on under exceptionally heavy traffic. Wilkinsburg is located on the main line of the Pittsburgh division, seven miles east of Pittsburgh, between the Brilliant cutoff connection and Port Perry. This portion of the line carries all passenger and freight traffic coming from the East for Pittsburgh or beyond, including all through freight traffic which is diverted via the Brilliant cutoff to avoid congestion in the Pittsburgh terminals. In addition there is a heavy suburban traffic which alone requires 70 trains daily.

The present layout provides for five tracks, two eastbound and two westbound, with a service track in the middle to serve a yard located between the two double track main lines just west of Wilkinsburg. All structures have been laid out, however, to permit ready revision in the future for the addition of a double track freight line along the north side, which will connect with the cutoff. The present work is a continuation of grade separation recently completed in the city of Pittsburgh immediately west, and naturally follows that work, for, although the borough of Wilkinsburg is separated from Pittsburgh politically, there is no real physical separation, and the density of the population in the former approximately equals that of the adjoining portion of the larger city. The conditions leading to grade separation in Wilkinsburg were emphasized by the fact that most of the important streets crossed the tracks at an angle of 57½ deg., thereby increasing the danger at the crossings under the prevailing heavy traffic on both the railroad and the streets. In three cases street interesections were located on the railroad tracks.

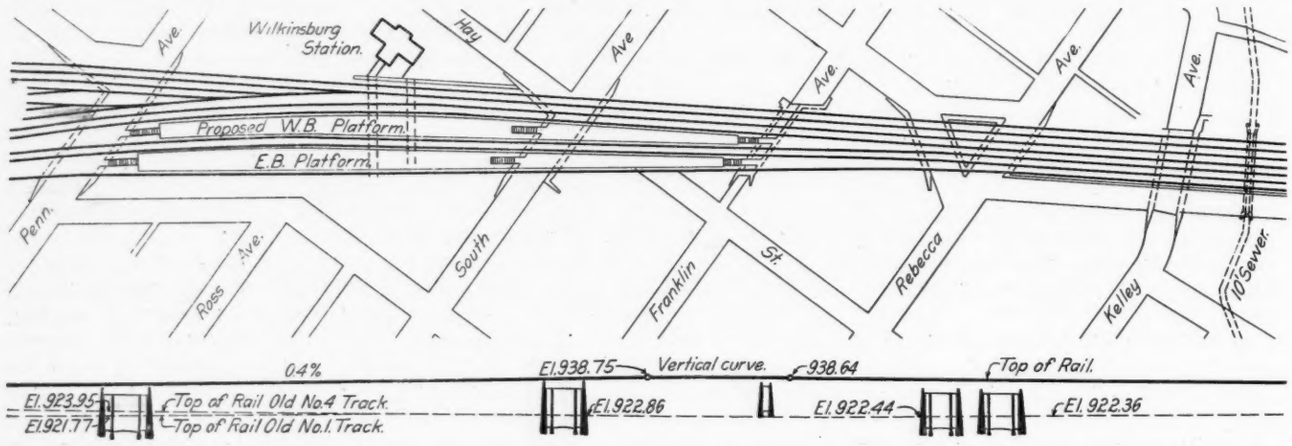
While not as rough as much of the country in the vicinity of Pittsburgh, the location of the railroad through Wilkinsburg presents considerable irregularity in topography which had been taken advantage of in the past to provide two subways under the tracks in natural depressions. One at Kelly avenue is used by a street car line, with the crown of the roadway about 26 ft. below the old base of rail level, the street also crossing under Pennwood avenue, which parallels the tracks along the south right of way line from Rebecca avenue to Lincoln avenue. The other subway is at Race street, Edgewood, near the east end of the present project. East of the Race street subway the railroad is in a cut for some distance crossed by numerous streets of the borough of Swissvale on overhead viaducts, so that the matter of grade separation in that vicinity has already been solved.

The new profile provides for a 0.4 per cent grade rising eastward from the previous work in Pittsburgh for a distance of 2,400 ft., reaching a summit on a vertical curve at Franklin avenue and then descending for 5,400 ft. on a 0.3 per cent grade, which reaches the old grade line a few hundred feet east of the Edgewood station. There are four street and three pedestrian subways, besides the old subways at Kelly avenue and Race street, and the passenger and baggage subways required for a new passenger station at Wilkinsburg.

SUBWAYS

Commencing on the west the first subway is that at Penn avenue, one of the most important streets in the city of Pittsburgh, and a part of the original Pittsburgh and Greensburg turnpike, now to be incorporated in the proposed Lincoln highway. The situation is complicated by the junction of Penn avenue with Pitt street within the limits of the subway, because the latter must be provided for in the subway north from the interesection. South of the intersection Pitt street has been closed as far as the railroad right of way line, but will be connected to Penn avenue south of the railroad by a short street parallel with the south right of way line. The subway has been built to provide eventually for 11 tracks, and gives a head room of 15 ft. In Penn avenue, which is 60 ft. wide, there are lines of supports at the curbs and on the center line of the street, forming two roadways having a clear width of 17 ft. each. In Pitt street, which is 50 ft. wide, there are lines of supports at the curbs only, leaving an unobstructed driveway 30 ft. clear.

The first seven tracks from the south end of the subway are supported on an all-reinforced concrete structure consisting of two mass abutments with reinforced concrete bents for intermediate supports covered by reinforced concrete slabs. Each bent consists of a row of columns surmounted by semi-circular arches, the columns being spaced to bring one arch under each track, a design commonly used in structures of this kind, and worked out in this case with exceptionally good proportions. In a number of cases the distance, center to center of tracks, is considerably more than the ordinary track spacing, and in such instances for the sake of economy, an open space has been left



General Plan and Profile of the Track Elevation Through Wilkinsburg

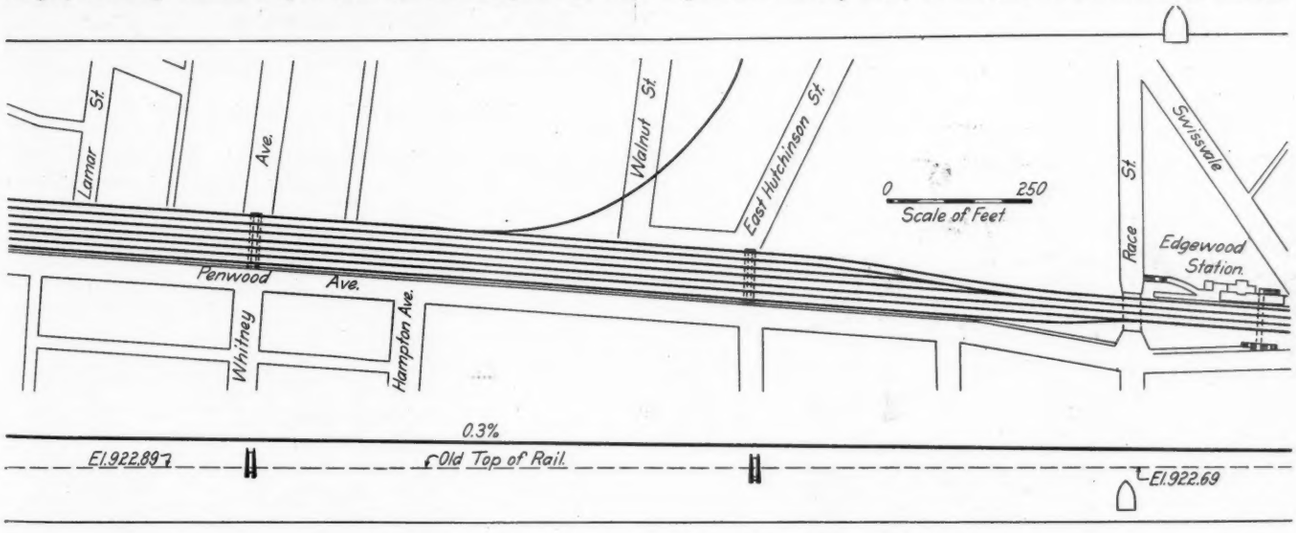
between the slabs of adjacent tracks, also breaking the continuity of the bents beneath. This was accomplished in a simple way by cutting through the arch in the plane of the face of the slab, a width of slab being selected that would cut off the arch at or near the crown. The same treatment was used at the ends of the bent on the south parapet of the structure, the effectiveness of this treatment being well shown in one of the accompanying photographs. The slabs which serve as the superstructure of the subway follow the standard practice of the Pennsylvania Railroad. The abutments are of mass concrete with a stepped back, and have the exposed faces broken up into horizontal courses 24 in. deep by the use of V-molds. This has the advantage that it breaks up the surface and tends to conceal any irregularities in the texture or shade of the concrete finish.

Owing to the complications resulting from the intersection of Pitt street with Penn avenue under the subway it was necessary to adopt steel construction for the four north tracks. In fact, these conditions resulted in the use of some rather heavy girders and columns, one of the latter carrying a concentration of 1,335,000 lb. The columns and the sway bracing between them are inclosed in concrete to give an appearance similar to that of the concrete bents at the other end of the subway, the arches between the posts being three-centered instead of semi-circular on account of the wider spacing of the steel columns. The floor, which is of the ballast type, consists of transverse I-beams encased in concrete. Where the tracks and the girders are spaced 13 ft. center to center, the beams are 18 in. 55 lb. I-beams, spaced 2 ft. center to center. The concrete encasement has a minimum depth of 2 in. over the tops of the I-beams, and extends up the sides of the girders to the under side of the top flanges, forming channel-shaped beds for the reception of the ballast which is pitched toward the center under the ties to afford drainage. The entire top surface is covered with a membrane waterproofing, protected under the tracks by ½ inch of cement mortar and a course of bricks laid flat to give a thickness of about 2 in. Up the sides of the troughs the protection consists of a thin shell of reinforced concrete. In order to save material and reduce the dead load the concrete encasement is not solid to the bottom of the I-beams, but is hollowed out on the under side between them to form rectangular troughs 15 in. deep. All concrete work in the floor is reinforced with wire mesh. The outside girders on the north side of the structure are encased in concrete and paneled to give an appearance similar to the parapet of the concrete slabs on the south side.

The subway at South avenue and Hay street is similar in layout to the Penn avenue subway, but the superstructure is all of structural steel. There are intermediate supports at the curb lines only, leaving an unobstructed driveway 30 ft. wide between curbs on both streets. It will provide eventually for seven tracks with a spacing of 22 ft. between the first and second, and 25 ft. between the third and fourth tracks (counting from the south) to allow for platforms for the new Wilkinsburg station. In all other cases the spacing of the tracks is 13 ft. The minimum head room of the subway is 14 ft.

At Franklin avenue there is a pedestrian subway 7 ft. 6 in. high and 16 ft. wide with a concrete slab cover. Wood street and Rebecca avenue also intersect near the center line of the right of way, but a rearrangement was made, relocating the end of Wood street to intersect Rebecca avenue south of the tracks. This gave two separate subways of seven tracks each, with 14½ ft. head room, and both of the same width and the same type of construction as the South avenue subway. Wood street and Rebecca avenue also have a connection north of the tracks by a new short street 30 ft. wide parallel to the tracks. By this arrangement there is a triangle of embankment approximately 110 ft. on a side between the two subways and the new street, which is entirely surrounded by retaining walls and abutments. It was concluded that this was a more satisfactory solution than a single subway structure of sufficient length to embrace both streets.

As stated previously, there has been a subway at Kelly avenue for some time, passing under the tracks and also under Pennwood avenue. The latter was formerly on a level with the tracks all the way from Rebecca avenue to near Race street, but is now separated from them for the entire distance by a retaining wall varying from 6 ft. to 16½ ft. in height, the difference in grade at Kelly avenue being 16 ft. It was unnecessary to make any change in the old structure, which is a 40-ft. segmental masonry arch, on account of the increased embankment load, but the structure was extended on the north end to provide for two additional tracks. On account of the greater height available this extension was made a semi-circular arch instead of a segmental arch, and as shown in one of the accompanying photographs, the use of V-grooves to break up the concrete surfaces, has been used with a pleasing effect. To avoid overloading the arch ring the retaining wall between the tracks and Pennwood avenue was not supported on the arch, but was designed to span across the opening from supports on either side carried on concrete piles.

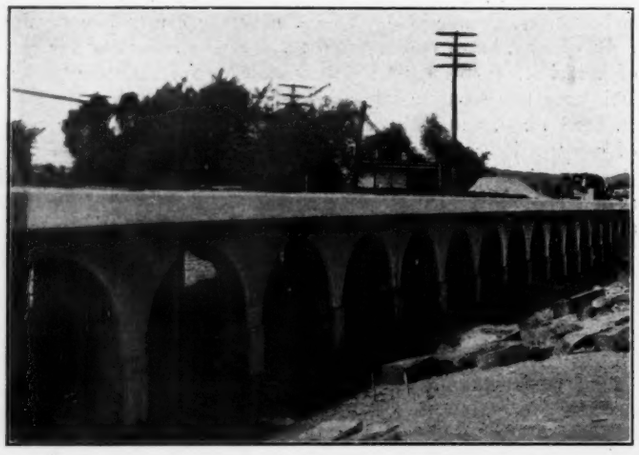


General Plan and Profile of the Track Elevation Through Wilkinsburg

Between Kelly avenue and Race street the tracks have not been elevated a sufficient amount to permit the construction of any regular street subways, but two pedestrian subways, 8 ft. wide by 7½ ft. high, have been provided, one at Whitney avenue and one at Hutchinson avenue. These subways are entirely of concrete, and with the exception of the south end of the Whitney avenue subway, stairways were necessary to get

down to the level of the subway floors. As shown in the accompanying photograph the entrances to the subways are protected by suitable hand railings and lamp posts. Adequate illumination was also provided for the interior.

At Race street there is an old four-track 40-ft. segmental arch subway of ashlar masonry, which adjoins the Edgewood suburban passenger station. No change is required at this sub-



East-Bound Platform, Wilkinsburg Station

way other than to raise the parapet and wing walls about 8 ft. and connect the southwest wing wall with the new Pennwood avenue retaining wall. The track elevation will result in no material changes in the Edgewood station at this time.

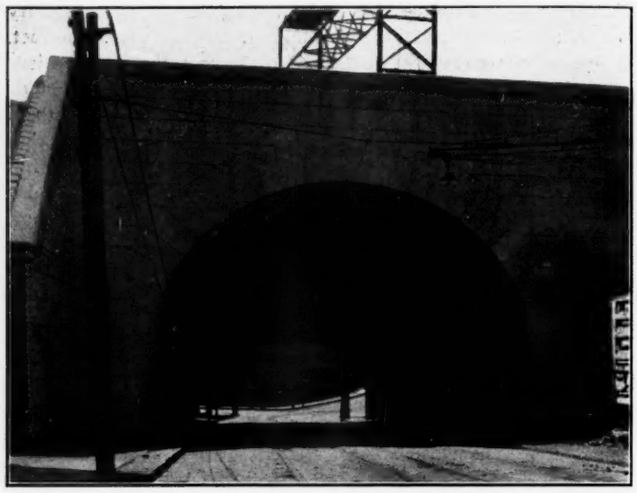
THE WILKINSBURG STATION

One of the most important features of the project is the new Wilkinsburg passenger station. The site of the old station at Franklin avenue and Wood street was deemed unsuitable, so

Whitney Avenue Pedestrian Subway

a new site was selected at the intersection of Ross avenue and Hay street. The building is to be located in the center of a triangular plot bounded by the embankment retaining wall, Hay street and a 20-ft. alley, known as Sawyer way. It is symmetrical with and faces down Ross avenue, giving it a conspicuous location. It consists of a central portion 34 ft. by 50 ft., occupied entirely by the general waiting room, with symmetrical wings on either side. The east wing contains the ticket office and a waiting room and toilet room for women. The west wing contains a news-stand and a waiting room and toilet room for men. On the track side three wide doors communicate with a lobby 16 ft. by 36 ft., from which access is had by a closed corridor, to a 12-ft. tunnel under the tracks leading to the platform stairways. A covered platform between the station proper and the railroad retaining wall, serves as a baggage room, from which a separate 12-ft. tunnel leads to baggage truck elevators. Brick with stone trim will be used for the exterior of the building, and with adequate space around the same for treatment with lawns and shrubbery, it will give a pleasing appearance.

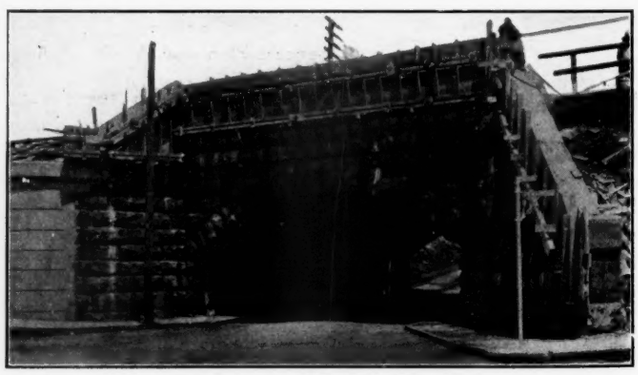
The arrangement of the platform facilities for the station were complicated by the fact that the immediate location of



Kelly Avenue Subway—North Extension

the westbound track does not conform to the proposed future arrangement, when the two freight tracks will be provided on the north side. This made it necessary to provide a temporary wooden platform for the westbound tracks and three sets of stairways and elevators, one for the eastbound platform and one each for the two locations for the westbound platform. The platforms vary from 15 ft. to 37 ft. in width on account of the curves in the tracks, and are between 900 and 1,000 ft. long.

Communication with the street has been effectively worked out. There are stairways to the Penn avenue and South avenue subways and the pedestrian subway in Franklin avenue as well as stairways both east and west from the station subway. The latter has an outlet on the south side which connects by a walk



Race Street Subway

with Pitt street and South avenue. The stairways are of concrete, between concrete retaining walls extended into the embankment from the subway abutments. The steps are fitted with flat type Universal safety treads, built monolithic with the

concrete. The platforms are of the high type, involving some interesting details. The permanent eastbound platform consists of a reinforced concrete slab 8½ in. thick, spanning between transverse concrete beams 9 ft. center to center. These beams are supported on three rows of reinforced concrete posts, extending through the fill and in turn resting on concrete piles. A 1½ in. asphalt mastic cover serves as a wearing surface and as waterproofing. As the tops of these platforms are 4 ft. 4 in. above the base of rail, there is a clear space of 3 ft. 6 in. between the top of the fill and the under side of the slab, which has been partly screened by building false arches between the outside columns. Similar construction is used for the platforms

North Elevation, Penn Avenue Subway

over the South avenue subway, except that the transverse concrete beams rest directly on the top flanges of the track girders and instead of single arch openings between the beams, three openings are provided 2 ft. wide with semi-circular tops. These openings assist materially in lighting the subway underneath

SEWER CONSTRUCTION

An independent project, carried on simultaneously by the track elevation forces is the reconstruction of a large masonry storm sewer just east of Kelly avenue. This sewer consisted of a semi-circular arch 6 ft. wide carried on 4-ft. bench walls for a length equal to the width of the right of way and joined on either end by a 10 ft. sewer. The borough of Wilkinsburg has required the railroad to enlarge the old sewer to 10 ft. to correspond with the portions outside of the right of way, maintaining that the 6-ft. section was no longer adequate, owing to the faster runoff to be obtained with the great increase in the relative proportion of the drainage area covered by impervious

South Elevation, Penn Avenue Subway

surfaces, in consequence of the construction of pavements and buildings. As the invert of the sewer is 50 ft. below the new track level, tunneling was obviously the only feasible method for reconstruction. The material encountered being clay, it was necessary to follow the heading very close with the timbering. The procedure adopted was to take down the old arch, widen out and take down the bench on one side and rebuild it 4 ft. further out. By this scheme one bench was saved. The new arch ring is of reinforced concrete. A 30 in. cast iron pipe sanitary sewer under the invert of the storm sewer offered a simple means of drainage during construction, as temporary holes cut in the top of the sanitary sewer readily served as catch basins.

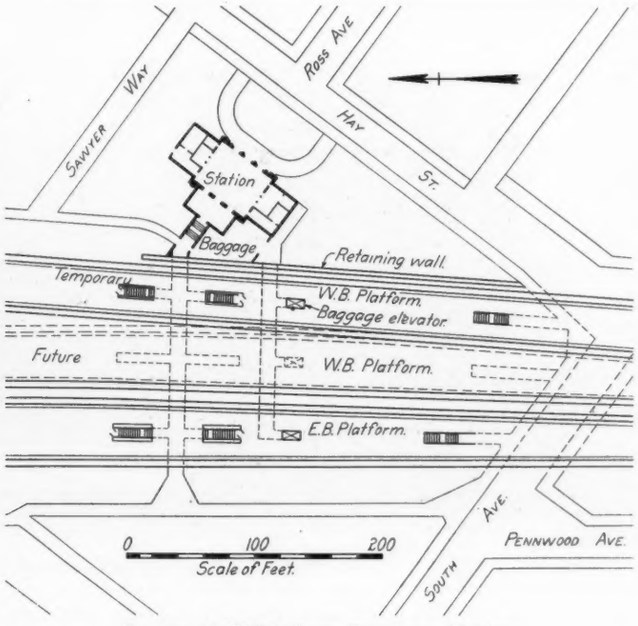
CONSTRUCTION

The foundations for the structures were sufficiently good to permit the use of natural foundation, except in such cases where the line traversed ravines or gullies subsequently filled. At such points it was out of the question to carry foundations down to the original ground surface, and the use of wood piles was not

Details of the Penn Avenue Subway, Stairway to Platform

permissible, because of the low level of the ground water, in all, a situation naturally suggesting the use of concrete piles. Simplex, reinforced concrete piles were selected and proved satisfactory, both as to ease of construction and quality of the finished product. Two piles uncovered by chance in the sewer tunnel, were found to be in excellent condition, showing perfect form and sound concrete. The piles were loaded to 30 tons each, and were driven with a 3,000 lb. drop hammer, the fall of the hammer not exceeding 15 ft.

A uniform finish was secured on the concrete surfaces of the walls and subways by rubbing with carborundum brick as

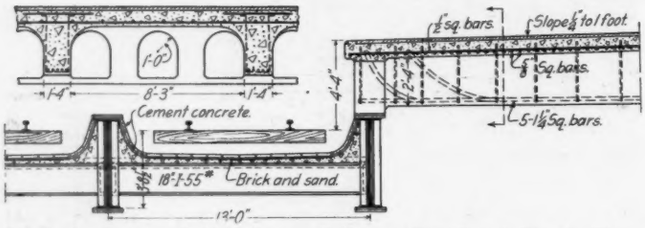


Layout of Wilkinsburg Passenger Station

soon as the forms were removed. In the subways the lighting was greatly improved by the use of white surfaces, secured by applying a wash consisting of "Skim Coat" mixed with neat cement immediately after the rubbing was finished The white

surface also adds materially to the appearance of the structures.

Owing to lack of head room for falsework, it was necessary to cast the slabs for the Penn avenue subway away from the site and to set them in place after they had been cured. The old freight yard at Hay street and Rebecca avenue was selected for this purpose. The slabs were set by two 100-ton wrecking cranes, several of the slabs weighing 70 tons. The setting of the slabs, as well as the erection of the structural steel work, was done by company forces. All masonry work is being built by the Dravo Construction Company, of Pittsburgh, which also



South Avenue and Hay Street Subway—Details of Track Floor and Platform

has the contract for the excavation, depressing the streets and grading for the new passenger station grounds and the new freight yard west of Penn avenue.

An interesting and rather unusual feature of the work was the doing of all filling by contract, including the raising of the tracks. The John F. Casey Company was the contractor for the filling, which was made entirely with granulated slag delivered on cars by the railroad company. The work is also out of the ordinary, because of the expensive method of filling which it was necessary to pursue on account of the extremely heavy traffic, which precluded the withdrawal of any track from service for more than a few minutes at a time. The tracks were raised in lifts small enough to permit the passage of trains at all times. At Penn avenue they were raised in place on filling which had to be removed later to provide for the subway. This method was superseded at the other streets by the use of cribs of cross ties to support the falsework deck for the tracks. These cribs were built up as the tracks were raised, and were replaced after the final lift had been made by frame bents on mud sills. The granulated slag proved to be a very efficient material for filling. It packed very hard almost immediately with little or no subsequent settlement. East of Rebecca avenue the contractor's work covered filling only a 0.5 per cent grade line, which is sufficient to clear the pedestrian subways at Whitney and Hutchinson avenues. The company will eventually raise the tracks to a 0.3 per cent grade line.

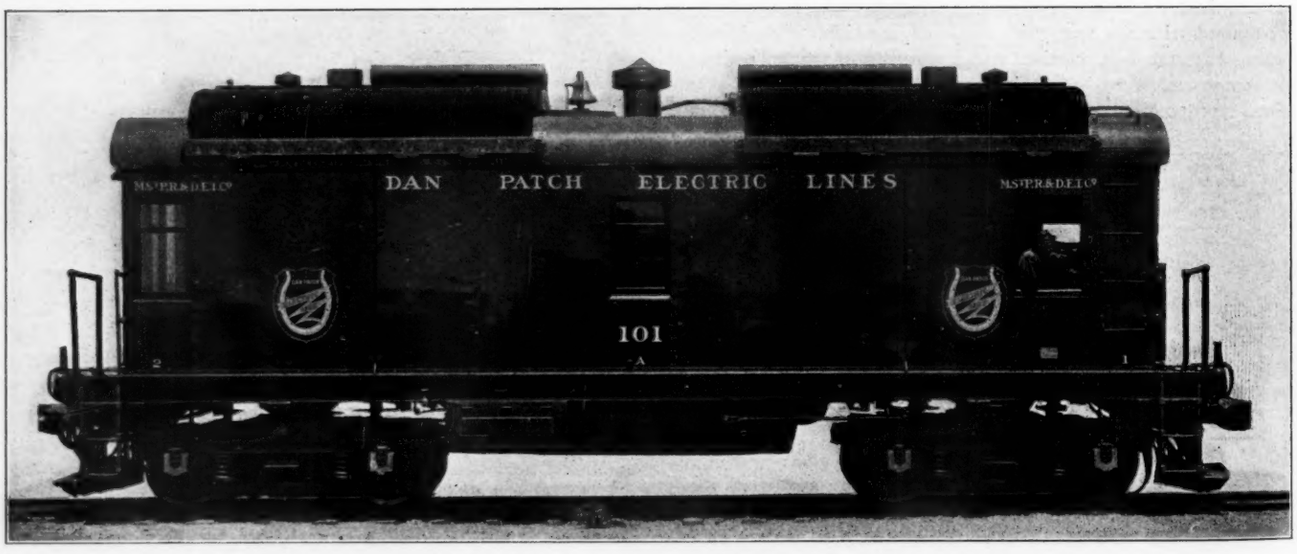
The work is being handled under the direction of A. C. Shand, chief engineer, Pennsylvania Railroad, and under the immediate supervision of F. M. Sawyer, assistant engineer, Johnstown, Pa. A. L. Ware is engineer in charge at Wilkinsburg.

60-TON GAS-ELECTRIC LOCOMOTIVE

The Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, operating what is popularly known as the "Dan Patch" electric lines, has recently put in service three 60-ton gas-electric locomotives for freight, passenger and terminal service. These are somewhat similar in design, although heavier than the 57-ton gas-electric locomotive,* which has been in successful operation daily for the past year or more from Minneapolis to Mankato, Minn. The four gas-electric locomotives, as well as 13 gas-electric motor cars which the railway has purchased, were designed and built by the General Electric Company. This is said to be the first railroad in the world operated entirely with gas-electric service.

The railway extends south from Minneapolis to Mankato, a distance of 107 miles. About midway of the line a branch runs northeast from Northfield to Randolph, 7 miles distant. The severest grade on the present line is 2 per cent. About 25 miles south of Minneapolis, at Orchard Gardens station, several thousand acres of farm land have been divided into 5 and 10-acre tracts by the company, and are being sold to residents of Minneapolis and St. Paul, many of whom have erected houses and travel to and from their places of business in the city each day.

Four through trains daily each way, one of which is a limited parlor car train, constitute the normal passenger schedule. The limited makes the run of 107 miles, including four stops, in 3 hr. 25 min.; the other trains require 4 hr. 5 min. for the trip. This service is supplemented by local trains between certain points of the line and the terminals, and by excursion trains during the summer season as occasion requires. One 70-ft. gas-electric motor car, seating 89 passengers, normally



60-Ton Gas-Electric Locomotive for the Dan Patch Electric Lines

makes the run; when travel is somewhat heavy, a trailer is added to this; and for excursions and extra heavy traffic, a train is made up of trailer cars drawn by a 60-ton gas-electric locomotive.

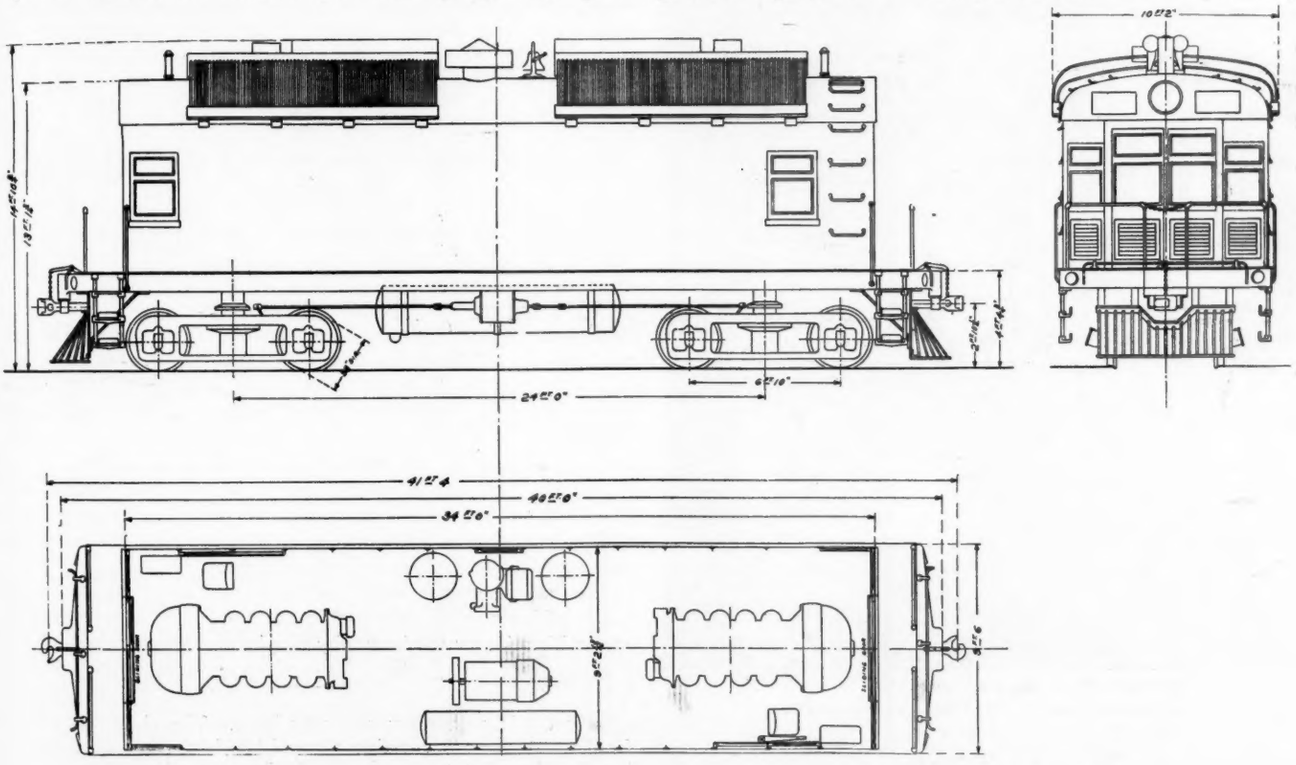
The new 60-ton locomotives are double ended and are built

* See *Railway Age Gazette*, November 14, 1913, page 916.

with the box type of cab extending nearly the entire length of the underframe; all the weight is on the drivers. The truck clearances allow for 100 ft. minimum radius curvature. The power plant consists of two generating sets similar to the one used in the gas-electric motor cars. Only an engineer is required to operate the locomotive.

The box cab is of all-steel construction, and both ends are removable to permit the installation of the apparatus. The interior is not divided into compartments. The generating sets and the controllers are installed in each end, while the auxiliary lighting set, air compressor and storage tanks are grouped in the central section. The operator's seat at the side of each end of the cab affords a clear view ahead of both sides of the track.

The underframe of the locomotive consists of 10-in., 30 lb. channels, which extend the entire length of the platform, and are tied together by heavy end frame cast steel buffers and bolster plates, each channel being riveted to the webs of the end frame castings and bolted to the top and bottom bolster plates. The bolsters are built up of 12-in. by 1⅛-in. steel plates.



General Arrangement of the Gas-Electric Locomotive for Use on the Dan Patch Electric Lines

Cross sills are riveted in where it is necessary to support equipment hung below the frame.

The two four-wheel swivel trucks are of the plate frame swing bolster type, designed for heavy freight work and conform to M C B standards. The side frames are built up of steel boiler plate. The truck bolster, of the swinging type, is built up of channels and pressed steel plates.

Each of the two gas-electric generating sets for the power plant equipment is composed of a 175 hp., 550 r. p. m., 8-cylinder, 4-cycle gasolene engine of the "V" type, which is direct-connected to a 600-volt, commutating pole, compound-wound electric generator with an outboard bearing supported by brackets bolted to the magnet frame. The cylinders are 8 in. by 10 in. Ignition is accomplished with low tension magnetos and the sets are started by air pressure in the same way as in the gas-electric motor cars, with the additional feature that after one set is running, the second may be started from the first electrically. The control is so arranged that either one or both of the generating units may be used to operate the locomotive from either end, in accordance with the requirements of the trailing train load.

Compressed air for starting is taken from the main reservoirs of the air brake system, which are built with surplus capacity. The two main single-cylinder air compressors are driven from the crankshafts of the main engines, have a displacement of 22.5 cu. ft. of free air per min. at the rated speed and are fitted with automatic governors to maintain a constant pressure. Greater flexibility of control and economy of operation result through electrical transmission of the energy. The engines can rotate at normal speed irrespective of the speed of the locomotive and deliver their maximum power, a feature of great advantage on grades, in case of snow storms or other emergency conditions involving sudden, heavy current demands.

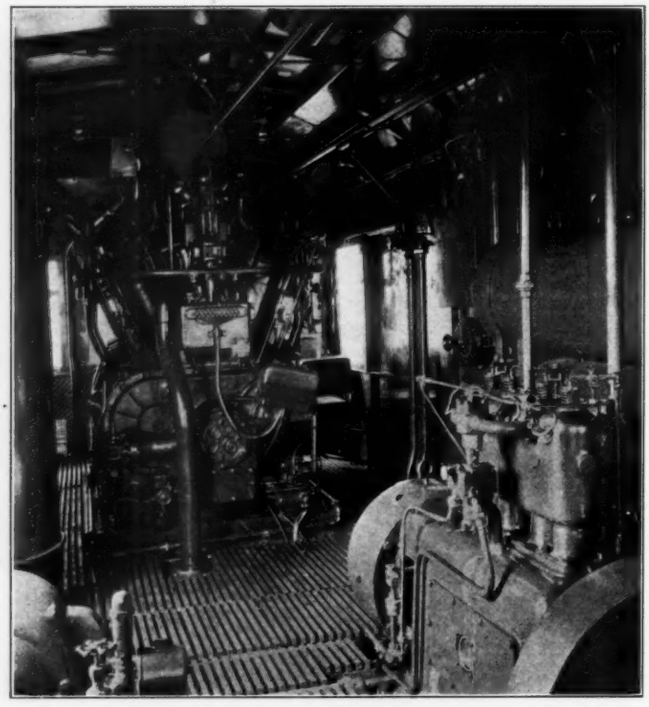
There is also an auxiliary gas-electric set, the function of which is to furnish power for lighting the cab, headlights and train coaches, and for pumping an initial charge of air to fill the tanks and start the main engines. This set is started by hand. It consists of a vertical, 750 r. p. m., 4-cylinder, 4-cycle gasolene engine, which is direct-connected to a 5 kw., 65-volt, commutating pole, compound-wound, electric generator. The cylinders are 3 in. by 6 in., and ignition is effected by a high tension magneto. The air compressor on the 65-volt circuit is a 2-cylinder, motor-driven, and has a piston displacement of 25 cu. ft. per min. when pumping against a tank pressure of 90 lb per sq. in. Air is taken from the cab interior through screens, and is delivered to the three reservoirs, each 87½ in. by 18 in., installed at one side of the cab in the center and connected in series, thereby affording an opportunity for radiation of heat and condensation of moisture before entering the brake cylinders. After starting the main engines, the governor on this motor-driven set cuts it out and all air is supplied by the air compressors on the main engine.

Mounted on the axles with nose suspension are four GE-205-D, 600-volt, series, commutating pole, oil-lubricated, box frame, railway motors having an hourly rating of 100 hp. each. All four axles are therefore driving axles, a forged pinion being mounted on each armature shaft and meshing into a corresponding cast steel split gear mounted on the axle. The gear ratio

is 58 to 17 teeth, a reduction of 3.41, which is especially adapted for freight and terminal switching service, as it affords maximum tractive effort at starting and at low speeds. The motors are ventilated by a special vacuum system in conjunction with the engines.

The control of the motor equipments is similar to that of the standard gas-electric motor cars, a type P-53 controller being installed in each end. Two motors are, however, connected permanently in parallel and these two pairs, operated like single motors, are placed progressively in series and parallel. The controller provides seven running stops in series and six in parallel, without rheostats in the main circuit. There are also two additional points for shunting the series fields, making a total of 15 efficient running points.

Inasmuch as electrical energy is transmitted directly, there are no losses through the intervention of mechanical change-speed gearing. To produce the smooth and rapid acceleration, the speed changes of the motors are effected by governing the



Interior of Cab of Gas-Electric Locomotive

voltage through varying the strength of the generator fields, which is accomplished by the movement of one handle on the controller. Separate handles are provided for throttling the engine and for reversing the motors. The latter is accomplished instantly by changing the motor connections in the usual manner, without stopping the engines, which always rotate in the same direction. This allows the train to be brought to a stop quickly, independent of the brakes, in an emergency.

The principal data and dimensions applying to the locomotive are as follows:

Track gage	4 ft. 8½ in.
Total weight	120,000 lb.
Weight per axle	30,000 lb.
Maximum tractive effort	32,200 lb.
Length between knuckle faces of couplers	41 ft. 4 in.
Length over cab	34 ft.
Height over-all	14 ft. 10¾ in.
Width over-all	10 ft. 2 in.
Total wheel base	24 ft.
Rigid wheel base	6 ft. 10 in.

RAILWAY EXTENSION IN GREECE.—The first rail of the Loussa-Salonika Railroad was recently laid at Pappapouli. By this line Athens and all ancient Greece will be in communication with the rest of the mainland of Europe.

LEGITIMATE FREEDOM FOR RAILROADS

[J. J. Hill in New York Times]

The railroad is the least common multiple of all national industry. Its expansion is an indispensable condition of growth. Like every other activity in the world requiring the investment of capital, it not only will not grow, it will contract if laws and regulations prevent it from earning a reasonable profit. If the railroad had existed at the time our Constitution was framed, there is little doubt that the states would have been forbidden to legislate concerning it, exactly as they were to tax imports. As in the case of the tariff, the regulation of railways should be in the hands of an expert nonpartisan commission, on which both they and the public should have fair representation, with power to act subject only to review by the courts.

As for the foreign carrying trade, American ships need only the same freedom from hampering regulations that those of other countries enjoy to restore the old precedence of our merchant marine. With ocean and land carriers free to make joint rates on export business to get the trade, as those of other nations are not merely permitted but encouraged to do, our foreign trade would take the same precedence that events have given to our international financial position.

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE

The tables on the two pages immediately following show the number of freight cars in service on all of the important railroads of the country in 1913 and 1914 and in 1900 and 1914. It will be noted that narrow-gage cars are excluded, as well as non-revenue cars, but that cars used to carry company freight are included. The railways are grouped under the heads of New England roads, trunk line roads, Southern classification roads, Central classification roads and Western classification roads.

The tables show the number of cars in service, the number of cars per mile of road, average length of haul, freight cars per thousand freight car miles and per thousand ton miles, the average rate per ton per mile, and the freight cars in service per thousand dollars of freight earnings.

The table does not show the capacity of cars and, of course, roads which show a decrease in the number of cars may have cars with a larger total capacity despite the smaller number.

ENGLISH RAILWAYMEN AND THE WAR.—The chairman of the English Railway Executive Committee has recently issued a list showing that to August 31, 1915, the total number of men from the railways of the United Kingdom who had enlisted was 92,658, that being no less than 14.9 per cent of the total of 621,588 men employed on the railways of the United Kingdom at the beginning of the war. The enlistments from the staffs of a number of the important railways are given herewith:

Company	Total number of men employed at commencement of war	Total number of men who have enlisted to August 31, 1915	Percentage of men enlisted to total number employed
Caledonian	23,766	2,794	11.8
Great Central	34,505	5,021	14.55
Great Eastern	33,676	4,889	14.5
Great Northern	34,458	4,479	13.0
Great Western	79,150	13,965	17.6
Lancashire & Yorkshire	37,812	6,191	16.37
London, Brighton & South Coast	16,269	2,205	13.55
London & North-Western	93,106	16,317	17.52
London & South-Western	24,270	2,988	12.23
Metropolitan	3,249	572	17.5
Metropolitan District	2,499	769	30.0
Midland	74,964	10,983	14.65
North British	24,858	2,500	10.06
North-Eastern	54,462	7,866	14.44
*South-Eastern & Chatham	23,092	2,689	11.64
Railway Clearing House	3,090	713	23.07

* The figure of 2,689 represents men who had enlisted to July 31, 1915.

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE ON RAILROADS OF THE UNITED STATES—1913 AND 1914.

Note.—Narrow gage cars excluded. Non-revenue cars excluded. Company freight included.

	Miles.		Frt. equipment.				Frt. cars per mile of road.		Average length of haul.		Freight Cars: Per 1,000 frt. car miles.		Freight Cars: Per 1,000 rev. ton miles.		Rate per ton mile. (Dollars)		Freight cars per $1,000 frt. earnings.	
	1913.	1914.	1913.	1914	Increase.	Decrease.	1913	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913	1914
NEW ENGLAND ROADS:						Per cent. of change.												
Boston & Maine	2,302	2,302	24,155	23,964	.....	191	0.82	10.5	10.4	106.82	106.46	.106	.107	.0089	.0091	.01054	.01057	0.84	0.86
Bangor & Aroostock	568	625	5,279	5,193	.....	86	1.63	9.3	8.3	132.05	126.93	.296	.246	.0247	.0215	.01146	.01225	2.15	1.76
Central Vermont	536	536	3,310	3,065	.....	245	7.40	6.2	5.7	73.96	79.09	.112	.103	.0104	.0090	.00930	.00920	1.12	1.01
Maine Central	1,205	1,209	9,347	9,640	298	.....	3.13	7.7	7.9	90.13	96.40	.160	.158	.0142	.0136	.01086	.01050	1.31	1.29
New York, New Haven & Hartford	2,114	2,003	36,185	35,713	.....	472	1.30	17.1	17.8	96.43	87.40	.163	.173	.0143	.0147	.01345	.01415	1.06	1.09
Total	6,725	6,675	78,276	77,575	.....	701	0.90	11.6	11.6	99.88	99.25	.167	.157	.0145	.0136	.01112	.01133	1.29	1.20
TRUNK LINE RAILROADS:																		
Baltimore & Ohio	4,456	4,478	88,619	86,974	.....	1,645	1.86	19.9	19.4	197.53	193.50	.103	.106	.0062	.0065	.00560	.00564	1.10	1.15
Buffalo, Roch. & Pittsburgh	576	586	17,181	17,438	257	.....	1.50	29.8	29.8	163.40	161.00	.179	.189	.0084	.0088	.00461	.00462	1.83	1.90
Central R. R. Co. of New Jersey	676	678	23,912	23,790	.....	122	0.51	35.4	35.1	72.56	72.80	.162	.169	.0096	.0100	.00882	.00877	1.09	1.14
Chesapeake & Ohio	2,319	2,349	42,691	43,555	864	.....	2.02	18.4	18.5	266.00	255.00	.123	.117	.0064	.0061	.00412	.00409	1.55	1.51
Delaware and Hudson Company	904	904	19,028	18,850	.....	178	0.93	21.0	20.9	146.80	137.48	.109	.111	.0058	.0064	.00663	.00690	0.94	1.00
Delaware, Lackawanna & Western	985	985	28,384	28,249	.....	135	0.48	28.8	28.6	171.82	176.76	.105	.108	.0070	.0074	.00727	.00743	0.96	0.99
Erie	2,258	2,257	49,119	52,775	3,656	.....	7.44	21.7	23.4	188.61	194.83	.101	.107	.0064	.0071	.00574	.00576	1.11	1.23
Lehigh Valley	1,451	1,440	43,409	45,583	2,174	.....	5.01	29.9	31.7	168.76	163.68	.126	.140	.0070	.0084	.00632	.00642	1.18	1.36
New York Central & Hudson River	3,753	3,774	78,748	77,202	.....	1,546	1.96	21.0	20.5	198.39	199.02	.085	.095	.0061	.0069	.00609	.00632	1.14	1.24
New York, Ontario & Western	566	568	6,568	6,351	.....	217	3.30	11.6	11.2	145.58	145.30	.106	.108	.0070	.0072	.00783	.00784	.090	0.92
Pennsylvania	4,111	4,512	148,073	146,429	.....	1,644	1.11	36.0	32.4	152.72	163.38	.115	.118	.0060	.0062	.00583	.00589	1.09	1.13
Philadelphia & Reading	1,020	1,120	42,651	40,730	.....	1,921	4.50	41.8	36.4	93.92	95.12	.132	.130	.0074	.0076	.00714	.00705	1.04	1.07
Western Maryland	543	661	7,944	9,116	1,172	.....	14.75	14.6	13.9	100.09	113.07	.135	.135	.0073	.0073	.00579	.00554	1.27	1.32
Total	23,618	24,312	596,327	597,042	715	.....	0.12	25.2	24.5	158.94	159.30	.122	.126	.0070	.0074	.00629	.00633	1.17	1.23
SOUTHERN CLASSIFICATION:																		
Atlantic Coast Line	4,617	4,661	28,920	29,539	619	.....	2.14	6.3	6.3	156.27	155.59	.131	.125	.0142	.0145	.01203	.01217	1.18	1.19
Central of Georgia	1,924	1,924	10,112	10,104	.....	8	0.08	5.3	5.2	146.97	150.40	.132	.128	.0096	.0094	.01049	.01083	1.15	1.10
Florida East Coast	642	696	1,370	1,819	449	.....	32.77	2.1	2.6	161.65	164.16	.049	.068	.0096	.0121	.01712	.01735	1.54	0.70
Louisville & Nashville	4,923	4,937	45,269	46,480	1,211	.....	2.67	9.2	9.4	171.00	171.09	.116	.114	.0082	.0084	.00779	.00778	1.05	1.08
Mobile & Ohio	1,119	1,122	10,606	10,776	170	.....	1.60	9.5	9.6	230.10	224.80	.094	.085	.0062	.0060	.00656	.00670	1.04	1.00
Nashville, Chat. & St. Louis	1,231	1,231	10,078	10,189	111	.....	1.10	8.2	8.3	150.00	151.00	.118	.127	.0108	.0122	.00995	.01054	1.08	1.16
Norfolk & Western	2,035	2,036	42,699	47,483	4,784	.....	11.20	21.0	23.3	270.81	269.28	.092	.098	.0048	.0052	.00424	.00420	1.12	1.23
Norfolk Southern	569	843	2,896	3,329	433	.....	14.95	5.1	3.9	87.50	85.63	.225	.198	.0202	.0185	.01584	.01518	1.28	1.22
Seaboard Air Line	3,074	3,084	16,845	17,629	784	.....	4.65	5.5	5.7	147.80	151.28	.111	.115	.0097	.0098	.01091	.01099	1.00	1.02
Southern Railway Co.	7,036	7,033	48,746	47,161	.....	1,585	3.25	6.9	6.7	155.43	154.61	.117	.110	.0086	.0084	.00982	.00983	1.08	1.05
Virginian Railway	503	503	7,023	7,196	173	.....	2.46	14.0	12.3	353.47	354.77	.107	.104	.0045	.0042	.00343	.00342	1.31	1.24
Total	27,673	28,070	224,564	231,705	7,141	.....	3.18	8.1	8.2	184.64	184.78	.117	.116	.0097	.0099	.00983	.00991	1.08	1.09
CENTRAL CLASSIFICATION:																		
Chicago, Ind. & Louisville	617	618	6,922	6,703	.....	219	3.16	11.2	10.8	138.29	135.74	.162	.147	.0099	.0096	.00745	.00730	1.48	1.45
Cincinnati, Hamilton & Dayton	1,015	1,015	9,602	9,449	.....	153	1.59	9.5	9.3	121.31	123.16	.130	.117	.0067	.0063	.00529	.00502	1.30	1.27
C. C. C. & St. L.	2,014	2,381	24,224	30,954	6,730	.....	27.78	12.0	13.0	154.50	162.80	.083	.099	.0050	.0067	.00547	.00531	1.07	1.32
Grand Rapids & Indiana	576	575	3,207	3,056	.....	151	4.71	5.6	5.3	96.32	93.82	.098	.093	.0063	.0062	.00705	.00707	0.98	0.97
Lake Erie & Western	906	906	2,796	2,681	.....	115	4.11	3.1	2.9	123.49	121.27	.052	.059	.0037	.0037	.00648	.00656	0.59	0.59
Lake Shore & Michigan Southern	1,853	1,852	57,693	56,071	.....	1,622	2.81	31.1	30.3	155.50	153.70	.119	.132	.0077	.0096	.00545	.00584	1.50	1.75
Michigan Central	1,800	1,800	25,681	25,032	.....	649	2.53	14.3	13.9	148.00	149.00	.087	.091	.0068	.0078	.00652	.00675	1.11	1.21
New York, Chicago & St. Louis	523	523	11,957	11,435	.....	522	4.36	22.9	21.9	197.00	206.00	.078	.073	.0058	.0061	.00514	.00514	1.16	1.23
Pennsylvania Company	1,750	1,757	62,073	58,925	.....	3,148	5.07	35.5	33.5	77.75	78.76	.138	.153	.0071	.0084	.00569	.00586	1.25	1.50
P. C. C. & St. Louis	1,472	1,472	30,210	29,920	.....	290	0.96	20.5	20.3	119.97	115.13	.088	.099	.0056	.0067	.00599	.00629	0.99	1.14
Pere Marquette	2,330	2,322	17,727	15,868	.....	1,859	10.49	7.6	6.8	173.63	166.42	.125	.117	.0083	.0082	.00603	.00611	1.48	1.44
Vandalia	876	910	8,821	8,120	.....	701	7.95	10.1	8.9	105.48	111.90	.108	.098	.0072	.0065	.00658	.00617	1.14	1.10
Total	15,732	16,131	260,913	258,214	.....	2,699	1.03	16.6	16.0	134.27	133.98	.106	.106	.0067	.0072	.00610	.00612	1.17	1.25
WESTERN CLASSIFICATION:																		
Atchison, Topeka & Santa Fe	10,771	10,961	66,213	65,230	.....	983	1.48	6.1	5.9	311.33	292.25	.094	.097	.0068	.0073	.01002	.01007	0.85	0.89
Chicago & Alton	1,026	1,033	11,667	13,803	2,136	.....	18.31	12.3	12.4	165.51	172.63	.099	.123	.0062	.0087	.00537	.00606	1.18	1.56
Chicago & Eastern Illinois	1,275	1,283	26,210	26,004	.....	206	0.79	20.6	20.3	159.73	150.43	.202	.200	.0107	.0111	.00520	.00510	2.19	2.30
Chicago & Northwestern	7,976	8,071	60,429	65,093	1,664	.....	7.71	7.6	8.1	140.12	143.85	.177	.193	.0096	.0104	.00870	.00870	1.11	1.21
Chicago, Burl. & Quincy	9,129	9,264	55,735	65,157	9,422	.....	16.91	6.1	7.0	263.30	265.91	.085	.098	.0063	.0075	.00729	.00729	0.87	1.04
Chicago Great Western	1,496	1,496	10,891	10.643	.....	248	2.28	7.3	7.1	224.42	217.65	.107	.100	.0075	.0072	.00732	.00729	1.11	1.07
Chicago, Mil. & St. Paul	9,613	9,681	62,216	63,361	1,145	.....	1.84	6.5	6.5	246.23	244.79	.090	.092	.0062	.0066	.00793	.00808	1.11	0.97
Chicago, Rock Isl. & Pacific	8,048	8,205	44,064	45,674	1,610	.....	2.29	5.5	5.6	224.76	219.50	.097	.101	.0070	.0075	.00890	.00860	0.95	1.03
Chicago, St. Paul, Minn. & Omaha	1,747	1,748	12,569	11,911	.....	658	5.23	7.2	6.8	153.91	152.85	.179	.177	.0099	.0092	.00860	.00880	1.16	1.04
Colorado & Southern	1,871	1,866	10,714	10,594	.....	120	1.12	5.7	5.7	154.06	143.05	.132	.152	.0093	.0122	.00944	.01033	0.99	1.17
Denver & Rio Grande	2,555	2,583	18,370	17,936	.....	434	2.36	7.2	6.9	128.45	126.78	.170	.176	.0107	.0109	.01194	.01201	1.02	1.05
Duluth, S. S. & Atlantic	628	627	3,309	3,196	.....	113	3.41	5.3	5.1	75.37	80.93	.184	.173	.0127	.0123	.00865	.00804	1.47	1.53
Great Northern	7,750	7,528	53,595	55,394	1,799	.....	3.36	6.9	7.4	227.02	224.59	.114	.126	.0061	.0069	.00765	.00790	0.92	1.01
Illinois Central	4,763	4,769	56,326	59,437	3,111	.....	5.52	11.8	12.5	242.56	240.83	.104	.104	.0064	.0065	.00577	.00563	1.32	1.35
Kansas City Southern	827	827	5,847	5,567	.....	280	4.79	7.1	6.7	240.87	238.77	.089	.077	.0054	.0049	.00788	.00784	0.73	0.67
Minn. & St. Louis	1,586	1,646	7,396	7.259	.....	137	1.85	4.7	4.4	161.68	155.01	.115	.110	.0072	.0074	.00804	.00840	1.02	1.01
Minn., St. Paul & S. Ste Marie	3,976	4,102	25,064	24,946	.....	118	0.47	6.3	6.1	229.12	203.04	.112	.124	.0075	.0090	.00704	.00735	1.07	1.22
Missouri Pacific	7,257	7,285	42,773	43,349	576	.....	1.35	5.9	5.9	227.83	225.78	.103	.100	.0064	.0068	.00807	.00799	0.93	0.99
Missouri, Kansas & Texas	3,677	3,825	25,650	25,515	.....	135	0.52	7.0	6.6	206.27	202.88	.132	.129	.0141	.0138	.01140	.01090	1.23	1.26
Northern Pacific	6,230	6,325	46,988	48,974	1,986	.....	4.23	7.5	7.7	292.80	275.60	.110	.128	.0075	.0087	.00867	.00854	1.07	0.99
St. Louis & San Francisco	5,255	5,259	32,071	31,384	.....	687	2.14	6.1	5.9	154.37	146.70	.125	.125	.0089	.0088	.01000	.01000	1.03	1.03
St. Louis Southwestern	1,609	1,735	11,430	11,657	227	.....	1.99	7.1	6.7	234.01	237.45	.149	.149	.0131	.0141	.01130	.01120	1.16	1.25
San Antonio & Aransas Pass	724	724	2,745	2,673	.....	72	2.62	3.8	3.7	143.10	135.36	.113	.123	.0130	.0130	.01639	.01613	0.78	0.88
Southern Pacific	10,311	10,422	50,049	51,392	1,343	.....	2.68	4.9	4.9	222.30	218.65	.091	.087	.0060	.0062	.01123	.01111	0.63	0.66
Texas & Pacific	1,885	1,885	11,201	11,016	.....	185	1.65	5.9	5.8	181.51	183.60	.095	.090	.0076	.0073	.00969	.00969	0.90	0.87
Union Pacific	7,349	7,597	30,682	34,772	4,090	.....	13.33	4.2	4.6	381.80	359.58	.062	.072	.0037	.0044	.00971	.00975	0.48	0.56
Wabash	2,515	2,515	23,127	22,450	.....	677	2.93	9.2	8.8	214.63	207.96	.083	.082	.0056	.0062	.00584	.00608	1.06	1.11
Total	121,849	123,262	807,331	834,387	27,056	.....	3.23	6.6	6.7	208.41	202.83	.119	.122	.0082	.0087	.00848	.00885	1.05	1.10
TOTAL ALL ROADS	195,597	198,450	1,967,411	1,998,923	31,512	.....	1.60	10.1	10.1	174.04	171.82	.121	.122	.0087	.0087	.00805	.00824	1.12	1.15

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE ON RAILROADS OF THE UNITED STATES—1900 AND 1914.

Note.—Narrow-gage cars excluded. Non-revenue cars excluded. Company freight included.

	Miles.		Frt. equipment.				Per cent. of change.	Frt. cars per mile of road.		Average length of haul.		Freight Cars— Per 1,000 frt. car miles.		Per 1,000 rev. ton miles.		Rate per ton mile. (dollars)		Freight cars per $1,000 frt. earnings.	
	1900.	1914.	1900.	1914.	Increase.	Decrease.		1900.	1914.	1900.	1914.	1900.	1914.	1900.	1914.	1900.	1914.	1900.	1914.
NEW ENGLAND ROADS:																			
Boston & Maine	1,787	2,302	12,230	23,964	11,734	.....	95.94	6.8	10.4	66.99	106.46	.126	.107	.0146	.0091	.01440	.01057	1.02	0.86
Boston & Albany	354	625	3,091	5,193	2,102	.....	68.00	8.7	8.3	89.62	126.93	....	.246	.0539	.0215	.01420	.01225	3.79	1.76
Central Vermont	513	536	2,006	3,065	1,059	.....	52.79	3.9	5.7	94.97	79.09	.063	.103	.0079	.0090	.00880	.00920	0.90	1.01
Maine Central	816	1,209	3,586	9,640	6,054	.....	168.82	4.4	7.9	81.11	96.40	.163	.158	.0123	.0136	.01130	.01050	1.09	1.29
New York, New Haven & Hartford	2,008	2,003	13,116	35,713	22,597	.....	172.29	6.5	17.8	85.36	87.40	.076	.173	.0097	.0147	.01451	.01415	0.67	1.09
Total	5,478	6,675	34,029	77,575	43,546	.....	127.97	6.5	11.6	83.61	99.25	.107	.157	.0197	.0136	.01264	.01133	1.49	1.20
TRUNK LINE ROADS:																			
Baltimore & Ohio	3,179	4,478	61,708	86,974	25,266	.....	40.94	19.3	19.4	194.81	193.50	.128	.106	.0068	.0065	.00412	.00564	1.96	1.15
Buffalo, Rochester & Pittsburgh	472	586	8,858	17,438	8,580	.....	96.86	18.7	29.8	136.16	161.00	.139	.189	.0097	.0088	.00470	.00462	1.99	1.90
Central of New Jersey	639	678	15,002	23,790	8,788	.....	58.58	23.4	35.1	77.88	72.80	.153	.169	.0118	.0100	.00871	.00877	1.36	1.14
Chesapeake & Ohio	1,476	2,349	17,270	43,555	26,285	.....	152.20	21.6	18.5	302.00	255.00	.082	.117	.0058	.0061	.00343	.00409	1.71	1.51
Delaware & Hudson	665	904	13,030	18,850	5,820	.....	44.67	19.6	20.9	94.46	137.48	.147	.111	.0113	.0064	.00789	.00690	1.54	1.00
Delaware, Lackawanna & Western	947	985	27,287	28,249	962	.....	3.53	28.8	28.6	151.00	176.76	....	.108	.0144	.0074	.00808	.00743	1.79	0.99
Erie	2,104	2,257	46,225	52,775	6,550	.....	14.17	21.9	23.4	194.40	194.83	.101	.107	.0089	.0071	.00559	.00576	1.60	1.23
Lehigh Valley	1,382	1,440	34,954	45,583	10,629	.....	30.41	25.3	31.7	188.08	163.68	.135	.140	.0106	.0084	.00542	.00642	1.97	1.36
New York Central & Hudson River	2,817	3,774	59,180	77,202	18,022	.....	30.40	21.1	20.5	163.00	199.02	....	.095	.0088	.0069	.00560	.00632	1.72	1.24
New York, Ontario & Western	480	568	5,899	6,351	452	.....	7.66	12.3	11.2	142.38	145.30	.144	.108	.0121	.0072	.00816	.00784	1.49	0.92
Pennsylvania Railroad	3,716	4,512	80,385	146,429	66,044	.....	82.16	21.6	32.4	109.54	163.38	.091	.118	.0067	.0062	.00540	.00589	1.25	1.13
Philadelphia & Reading	1,000	1,120	31,824	40,730	8,906	.....	27.99	31.8	36.4	89.42	95.12	.139	.130	.0114	.0076	.00831	.00705	1.50	1.07
Western Maryland	279	661	691	9,116	8,425	.....	1219.25	2.5	13.9	51.02	113.07	....	.135	.0038	.0073	.00734	.00554	0.53	1.32
Total	19,176	24,312	402,313	597,042	194,729	.....	48.40	21.0	24.5	153.16	159.30	.098	.126	.0093	.0074	.00637	.00633	1.55	1.23
SOUTHERN CLASSIFICATION:																			
Atlantic Coast Line	1,759	4,661	5,378	29,539	24,161	.....	449.26	3.6	6.3	121.90	155.59	....	.125	.0143	.0145	.01401	.01217	1.02	1.19
Central of Georgia	1,196	1,924	5,041	10,104	5,063	.....	100.44	4.2	5.2	148.86	150.40	.107	.128	.0183	.0094	.01096	.01083	1.26	1.10
Florida East Coast	.....	696	.....	1,819	1,819	.....	.....	....	2.6	.....	164.16	....	.068	.....	.0121	.....	.01735	....	0.70
Louisville & Nashville	3,007	4,937	23,402	46,480	23,078	.....	98.61	7.7	9.4	163.00	171.09	.096	.114	.0090	.0084	.00758	.00778	1.13	1.08
Mobile & Ohio	876	1,122	5,389	10,776	5,387	.....	99.96	6.2	9.6	195.63	224.80	....	.085	.0076	.0060	.00590	.00670	1.33	1.00
Nashville, Chattanooga & St. Louis	1,189	1,231	5,328	10,189	4,861	.....	91.23	4.4	8.3	151.00	151.00	.113	.127	.0096	.0122	.00880	.01054	1.10	1.16
Norfolk & Western	1,551	2,036	18,656	47,483	28,827	.....	154.52	12.0	23.3	253.41	269.28	.085	.098	.0068	.0052	.00430	.00420	1.58	1.23
Norfolk Southern	147	843	409	3,329	2,920	.....	713.93	2.8	3.9	57.42	85.63	....	.198	.0161	.0185	.01770	.01518	0.91	1.22
Seaboard Air Line	(1901) 2,604	3,084	8,335	17,629	9,294	.....	111.51	3.2	5.7	153.32	151.28	.119	.115	.0136	.0098	.01180	.01099	1.14	1.02
Southern Railway	6,306	7,033	26,814	47,161	20,347	.....	75.88	4.2	6.7	168.82	154.61	.107	.110	.0116	.0084	.00916	.00983	1.27	1.05
Virginia Railway	.....	503	.....	7,196	7,196	.....	.....	....	12.3	.....	354.77	....	.104	.....	.0042	.....	.00342	....	1.24
Total	18,635	28,070	98,752	231,705	132,953	.....	134.63	5.3	8.2	157.04	184.78	.105	.116	.0119	.0099	.01002	.00991	1.19	1.09
CENTRAL CLASSIFICATION:																			
Chicago, Indianapolis & Louisville	546	618	5,440	6,703	1,263	.....	23.21	9.9	10.8	153.00	135.74	.155	.147	.0141	.0096	.00757	.00730	1.86	1.45
Cincinnati, Hamilton & Dayton	652	1,015	7,838	9,449	1,611	.....	20.55	12.0	9.3	108.96	123.16	....	.117	.0122	.0063	.00610	.00502	2.00	1.27
C. C. C. & St. Louis	1,891	2,381	15,484	30,954	15,470	.....	99.91	8.2	13.0	169.30	162.80	.094	.099	.0083	.0067	.00583	.00531	1.42	1.32
Grand Rapids & Indiana	582	575	3,015	3,056	41	.....	1.36	5.2	5.3	90.12	93.82	.140	.093	.0156	.0062	.00870	.00707	1.88	0.97
Lake Erie & Western	725	906	5,549	2,681	.....	2,868	51.68	7.6	2.9	153.51	121.27	.137	.059	.0110	.0037	.00614	.00656	1.89	0.59
Lake Shore & Michigan Southern	1,411	1,852	19,958	56,071	36,113	.....	180.94	14.1	30.3	178.00	153.70	.067	.132	.0055	.0096	.00505	.00584	1.09	1.75
Michigan Central	1,635	1,800	14,219	25,032	10,813	.....	76.04	8.6	13.9	193.50	149.00	....	.091	.0070	.0078	.00592	.00675	1.19	1.21
New York, Chicago & St. Louis	513	523	6,743	11,435	4,692	.....	69.58	13.1	21.9	297.00	206.00	.059	.073	.0055	.0061	.00478	.00514	1.16	1.23
Pennsylvania Company	1,396	1,757	43,967	58,925	14,958	.....	34.01	31.5	33.5	77.95	78.76	.177	.153	.0135	.0084	.00590	.00586	2.30	1.50
P. C. C. & St. Louis	1,407	1,472	12,884	29,920	17,036	.....	132.22	9.1	20.3	111.14	115.13	.056	.099	.0052	.0067	.00620	.00629	0.84	1.14
Pere Marquette	1,821	2,322	7,944	15,868	7,924	.....	99.75	4.3	6.8	112.64	166.42	....	.117	.0124	.0082	.00802	.00611	1.55	1.44
Vandalia	727	910	5,922	8,120	2,198	.....	37.12	8.1	8.9	74.46	111.90	.121	.098	.0119	.0065	.00718	.00617	1.66	1.10
Total	13,306	16,131	148,963	258,214	109,251	.....	73.34	11.2	16.0	143.63	133.98	.112	.106	.0102	.0072	.00645	.00612	1.57	1.25
WESTERN CLASSIFICATION:																			
Atchison, Topeka & Santa Fe	7,426	10,961	27,486	65,230	37,744	.....	137.32	3.7	5.9	349.19	292.25	.073	.097	.0079	.0073	.00976	.01007	0.81	0.89
Chicago & Alton	855	1,033	9,386	13,803	4,417	.....	47.06	10.9	12.4	176.16	172.63	.135	.123	.0148	.0087	.00794	.00606	1.87	1.56
Chicago & Eastern Illinois	711	1,283	8,206	26,004	17,798	.....	216.89	11.5	20.3	144.70	150.43	.132	.200	.0096	.0111	.00483	.00510	1.99	2.30
Chicago & Northwestern	5,219	8,071	40,846	65,093	24,247	.....	59.36	7.8	8.1	151.30	143.85	.108	.193	.0106	.0104	.00830	.00870	1.28	1.21
Chicago, Burlington & Quincy	7,546	9,264	42,287	65,157	22,870	.....	54.08	5.6	7.0	254.87	265.91	....	.098	.0111	.0075	.00851	.00729	1.29	1.04
Chicago Great Western	930	1,496	5,782	10,643	4,861	.....	84.07	6.2	7.1	301.68	217.65	.087	.100	.0081	.0072	.00720	.00729	1.13	1.07
Chicago, Milwaukee & St. Paul	6,423	9,681	35,740	63,361	27,621	.....	77.28	5.6	6.5	189.07	244.79	.093	.092	.0106	.0066	.00929	.00808	1.14	0.97
Chicago, Rock Island & Pacific	3,647	8,205	17,150	45,674	28,524	.....	166.32	4.7	5.6	213.00	219.50	.094	.101	.0096	.0075	.00990	.00860	1.08	1.03
Chicago, St. Paul, Minn. & Omaha	1,557	1,748	10,253	11,911	1,658	.....	16.17	6.6	6.8	160.55	152.85	.149	.177	.0135	.0092	.00971	.00880	1.39	1.04
Colorado & Southern	762	1,866	2,979	10,594	7,615	.....	255.62	3.9	5.7	101.00	143.05	.108	.152	.0115	.0122	.01242	.01033	0.93	1.17
Denver & Rio Grande	1,674	2,583	8,359	17,936	9,577	.....	114.57	4.9	6.9	.....	126.78	.118	.176	.....	.0109	.....	.01201	1.09	1.05
Duluth, S. S. & Atlantic	585	627	2,697	3,196	499	.....	18.50	4.6	5.1	49.07	80.93	....	.173	.0209	.0123	.01221	.00804	1.70	1.53
Great Northern	5,418	7,528	21,484	55,394	33,910	.....	157.84	3.9	7.4	192.00	224.59	.104	.126	.0085	.0069	.00899	.00790	0.93	1.01
Illinois Central	3,996	4,769	32,439	59,437	26,998	.....	83.23	8.1	12.5	213.83	240.83	.092	.104	.0094	.0065	.00651	.00563	1.45	1.35
†Iowa Central	510	.....	2,238	.....	.....	2,238	100.00	4.4	...	152.30	.....	.099	....	.0084	.....	.00696	.....	1.21	....
Kansas City Southern	833	827	5,118	5,567	449	.....	8.77	6.1	6.7	304.41	238.77	.118	.077	.0091	.0049	.00613	.00784	1.49	0.67
†Minneapolis & St. Louis	597	1,646	3,066	7,259	4,193	.....	136.75	5.1	4.4	108.79	155.01	.196	.110	.0155	.0074	.01212	.00840	1.45	1.01
Minn., St. Paul & Sault Ste. Marie	1,255	4,102	6,631	24,946	18,315	.....	276.20	5.3	6.1	194.65	203.04	.129	.124	.0109	.0090	.00658	.00735	1.67	1.22
Missouri Pacific	4,938	7,285	25,186	43,349	18,163	.....	72.12	5.1	5.9	236.24	225.78	.102	.100	.0095	.0068	.00834	.00799	1.15	0.99
Missouri, Kansas & Texas	2,218	3,825	9,669	25,515	15,846	.....	163.88	4.4	6.6	298.93	202.88	.073	.129	.0082	.0138	.00840	.01090	0.98	1.26
Northern Pacific	5,006	6,325	23,138	48,974	25,836	.....	111.66	4.6	7.7	309.60	275.60	.105	.128	.0104	.0087	.00987	.00854	1.04	0.99
St. Louis & San Francisco	*1,659	5,259	5,974	31,384	25,410	.....	425.34	3.6	5.9	182.05	146.79	.093	.125	.0114	.0088	.01058	.01000	1.08	1.03
St. Louis Southwestern	1,258	1,735	5,386	11,657	6,271	.....	116.43	4.3	6.7	196.28	237.45	.127	.149	.0130	.0141	.01110	.01120	1.17	1.25
San Antonio & Aransas Pass	687	724	1,553	2,673	1,120	.....	72.12	2.3	3.7	162.26	135.36	.113	.123	.0142	.0130	.01861	.01613	0.95	0.88
Southern Pacific	7,576	10,422	29,413	51,392	21,979	.....	74.73	3.9	4.9	307.31	218.65	.096	.087	.0062	.0062	.00957	.01111	0.73	0.66
Texas & Pacific	1,570	1,885	6,263	11,016	4,753	.....	75.90	3.9	5.8	231.77	183.60	.079	.090	.0093	.0073	.01030	.00969	0.91	0.87
Union Pacific	5,428	7,597	21,826	34,772	12,946	.....	59.30	4.0	4.6	305.68	359.58	.080	.072	.0082	.0044	.01046	.00975	0.78	0.56
Wabash	2,340	2,515	13,087	22,450	9,363	.....	71.54	5.6	8.8	216.70	207.96	.071	.082	.0068	.0062	.00558	.00608	1.23	1.11
Total	82,624	123,262	423,642	834,387	410,745	.....	96.95	5.0	6.7	211.25	202.83	.104	.122	.0106	.0087	.00926	.00885	1.21	1.10
TOTAL ALL ROADS	139,219	198,450	1,107,699	1,998,923	891,224	.....	80.46	8.0	10.1	184.09	171.82	.105	.122	.0112	.0087	.00854	.00824	1.36	1.15

† 1914 operations of Iowa Central R. R. Co. included in Minneapolis & St. Louis R. R. Co.
* Before consolidation with other companies.

General News Department

The Brotherhood of Railroad Trainmen has addressed to the general managers of all railroads entering Chicago a request for an increase of pay of 5 cents an hour for switchmen.

Telephones have been put in use for train despatching on the Ohio division of the Baltimore & Ohio Southwestern between Cincinnati and Parkersburg, 195 miles. Telephones were already in use on the lines from Cincinnati to Seymour, Ind., and from Seymour to Louisville.

A hurricane which passed over New Orleans and vicinity September 29 is reported to have caused upward of 300 deaths, mostly in situations remote from cities, and money damage roughly estimated at $1,000,000. The roadbed of the Louisville & Nashville was seriously damaged at many places along the line from New Orleans to Ocean Springs, Miss., 83 miles. Long bridges at Bay St. Louis and at Rigolets were badly damaged.

One of the 50 electric locomotives being delivered by the General Electric Company to the Chicago, Milwaukee & St. Paul for use on the line between Harlowton, Mont., and Avery, Idaho, was placed on exhibition this week at the Union Station in Chicago. These locomotives are to be put in service sometime in November. The locomotives weigh 260 tons each, have 8 pairs of driving wheels, are 112 ft. long over all and are designed for operation with direct current at 3,000 volts.

A press despatch October 3 from Imlay, Nev., reports damage by earthquake shocks for a hundred miles along the line of the Southern Pacific. Several water tanks toppled from their high supports and one at Lovelock crushed the end of a dwelling. People fled from their homes in night clothing at many places. Slow orders were issued to all trains when the third shock was felt at 11 o'clock on the night of the third. At Golconda, Nev., a piece of track sank five inches. All the towns named are between Sparks and Battle Mountain.

The United States Civil Service Commission announces examinations, November 2, for eight positions under the department of valuation of the Interstate Commerce Commission, all of them being places in which special weight will be given to experience in valuation and unit cost work. Each candidate must be between 25 and 45 years old and the salaries, in all of the positions, range from $1,800 to $2,700 yearly. The positions are: Senior architect, second grade; senior structural engineer, second grade; senior electrical engineer, second grade; senior mechanical engineer, second grade; senior telegraph engineer, second grade; senior telephone engineer, second grade; senior signal engineer, second grade, and senior civil engineer, second grade.

C. W. Galloway, general manager of the Baltimore & Ohio, proposes to send letters, embodying suggestions for personal safety, to automobilists who take risks at crossings. This was decided upon because of the alarming increase in accidents during the past year, when 29 automobiles were struck by trains on the Baltimore & Ohio, an increase of 17 accidents and 23 deaths. Observations will be taken from time to time at busy street crossings, and, with the co-operation of State authorities, license numbers will be secured and owners addressed personally. At Uniontown, Pa., on September 12, 729 automobiles crossed the railroad tracks at Fayette street between 6 o'clock in the morning and 6 at night, and only 28 were stopped to ascertain whether or not a train was approaching, 24 of them being stopped by a train using the crosing; and of the 701 vehicles violating the rules, 705 did not even slacken speed. "It is horrifying," says Mr. Galloway, "to contemplate the disregard which some drivers have for their own safety. . . . Trainmen are trained to be mindful of their personal safety and the safety of others. They are impressed with the importance of sounding whistle signals at highway crossings and when approaching stations, yet there are automobilists who will approach railroad tracks without signalling or ascertaining in any way whether it is safe to cross. Engineers serve for years before they are entrusted with the operation of a locomotive, while automobilists, sometimes with an hour's instruction, jeopardize the lives of themselves and others by recklessly crossing tracks."

Completion of Hell Gate Arch

Work on the Hell Gate Bridge (New York Harbor) of the New York Connecting Railroad, which was the subject of an illustrated description in the *Railway Age Gazette*, September 3, page 422, has now progressed so far that the two halves of the great arch were joined together on October 1. On that day Samuel Rea (president of the Pennsylvania), as president of the New York Connecting Railroad Company, sent the following message to Gustav Lindenthal, chief engineer in charge:

"I heartily congratulate you as designer and chief engineer of the East River arch bridge upon the closing of that great arch to-day. I deeply regret I cannot be present to witness the physical linking in New York City of the New Haven and Pennsylvania systems. It is now over 25 years since, with our friend, the late Oliver W. Barnes, we decided that a bridge and railroad crossing the East River at this point should be constructed to connect the New England railroads with the trunk lines serving the West and South, and Mr. Barnes organized the New York Connecting Railroad Company, which was acquired later by the Pennsylvania and New Haven companies.

"Within eighteen months I hope we shall see the completion of the New York Connecting Railroad and of the Seventh avenue subway in Manhattan, which will conclude the Pennsylvania Railroad Company's comprehensive programme for terminal development in and through New York City, adopted thirteen years ago under the presidency of A. J. Cassatt. With these projects completed, full opportunity will be afforded to measure the benefit of the New York terminal improvements to the public, the country at large and the company."

Hearing on Locomotive Rules

At a hearing before the Interstate Commerce Commission, at Washington, September 28 and the four following days, the proposed standard rules for the inspection of locomotives and tenders were the subject of testimony by representatives of the railroad, and members of the Enginemen's Brotherhood; also by Chief Inspector Frank McManany. As to 58 rules on which there was agreement among all interested, a joint recommendation was submitted to the commission, with a request for the early issuance of an order. A large part of the time of the hearing was taken up with a discussion of the proposed rules requiring automatic bell-ringers and headlights of high intensity, both of which were advocated by the enginemen and opposed by the railroads. The roads were allowed 30 days in which to file a brief, and the other side 15 days for counter briefs, and then the roads will have 10 days in which to reply.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, date of next or regular meetings, and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October 21-23, 1915, Boston, Mass.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Next meeting, October 26-27, 1915, French Lick Springs Hotel, French Lick Springs, Ind.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York. Annual convention, October 4-8, 1915, San Francisco, Cal.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November 17, 1915, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 7-10, 1915, New York.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, 2d Tuesday in October, 1915, New York.

Association of Railway Electric Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual meeting, October 18-24, 1915, Chicago.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 14-15, 1915, St. Louis, Mo.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next meeting, October 19-21, 1915, St. Louis, Mo.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.

Peoria Association of Railroad Officers.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.

Railroad Men's Improvement Society.—J. B. Curran, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May, Assembly Rooms of Trunk Line Association, 143 Liberty St., New York.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December, 1915. Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October 5-7, 1915, Chicago.

Railway Real Estate Association.—Frank C. Irvine, 1125 Pennsylvania Station, Pittsburgh, Pa. Next meeting, October 13, 1915, Chicago.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake Transportation Club.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., 1134 La Salle St. Sta., Chicago. Annual meeting, October 19-21, Colorado Springs, Colo.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of Newark.—John J. Kautzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Gen'l Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Utah Society of Engineers.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.

Western Canada Railway Club.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Building, Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

Traffic News

The Chicago, Milwaukee & St. Paul has recently introduced a new plate service in the dining cars of all trains except the Pioneer Limited, by which passengers who do not care for full portions can obtain half orders at a considerable reduction in price.

The Baltimore & Ohio has opened its large new storage warehouse at Pittsburgh, Pa., at Second avenue and Try street. The warehouse is seven stories high and absolutely fireproof. Each floor has windows on all four sides and is well lighted and can also be well ventilated, and commodious elevator service is provided.

Following the suggestion of the governor of the state, the Public Service Commission of Pennsylvania has made a study of the main route of the "Lincoln highway" through that state, 331 miles, with a view to improving the safety of the road at crossings of railways; and it finds, according to the estimates of the engineer of the commission, that to abolish all of these grade crossings will cost $8,340,000.

The Baltimore & Ohio reports the arrival in Baltimore of a single shipment of lumber from Hoquiam, Wash., filling 100 cars. This lumber was cypress—3,000,000 feet—to be used in the construction of the plant of the United States Industrial Alcohol Company, at Curtis Bay, Baltimore. The lumber came over the Chicago, Milwaukee & St. Paul to Chicago and made the journey through in 17 days.

Traveling Passenger Agents

The American Association of Traveling Passenger Agents, at its meeting in Boston this week, chose William D. Woods, of St. Louis, president for the ensuing year and G. G. Noble, of Philadelphia, vice-president. The meeting next year will be held at Philadelphia.

Panama Canal Blocked for a Month

The landslide which blocked the Panama Canal at Gold Hill, September 20, has been followed by others, and it is announced this week that vessels cannot pass through before November 1.

At least 1,000,000 yards of earth must be removed. On Tuesday the steamer Finland from New York was waiting, with 300 passengers aboard, and another vessel of the same line was waiting on the Pacific side. Both these vessels have also large cargoes of freight. The quantity of freight in vessels waiting to pass through the canal is so great that it could not be transported over the Panama Railroad in less than a month. Colonel Chester Harding, engineer in charge of the canal, has recommended that tolls already paid by waiting vessels be refunded.

Electrification in England.—It is stated that experiments have been commenced on the electrified section of the North-Eastern Railway from Shildon to Newport, and the company hopes to open the line to traffic by the end of the month. This will constitute the first application in the British Isles of electric locomotives to heavy goods traffic, though, as is well known, this system has worked successfully in the United States and on the Continent, notably in Italy. Two small electric locomotives have, however, been in operation for ten years from the Quayside, Newcastle, to Trafalgar sidings, their use being due to a desire for cleaner working in the tunnel. The line now electrified was decided on for the first experiments because there are no steep gradients or any great obstacles to electrification. Also the traffic is almost entirely heavy goods, feeding the blast furnaces at Erimus sidings, Newport, near Middlesbrough, so that the working results will be easily ascertainable. An overhead system is employed, with two bow collectors on each engine. Altogether there will be ten locomotives, of which nine are already built at the company's Darlington works and tested. They are eight-wheeled, with a motor driving each axle, and can each haul a load of 1,000 tons. Power will be supplied at 1,500 volts to the overhead conductors, which will be about 17½ ft. above rail level.—*The Engineer, London.*

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The hearings before Examiner Hines of the Interstate Commerce Commission at Chicago, on proposed advances on a number of commodities in Western trunk line and Southwestern Tariff Committee territory, were concluded on October 4.

Commercial organizations of Madison, Beloit, Janesville, Stoughton and Watertown, Wisconsin, have filed a complaint with the Interstate Commerce Commission alleging discrimination against them in favor of Chicago, Rockford and Freeport, and other Illinois cities, Milwaukee, Wis., and Dubuque and Clinton, Iowa.

Examiner Gutheim held a hearing at Chicago, beginning on September 29, on the application of the railroads operating steamboat lines on the Great Lakes for authority to make general advances in the lake-and-rail rates, equal in cents per hundred pounds to the advances on all-rail rates resulting from the decision of the Interstate Commerce Commission in the five per cent case. Representatives of some of the principal commercial associations appeared in opposition to the advances. C. C. McCain, chairman of the Trunk Line Association, and H. S. Noble, assistant general manager of the Mutual Transit Company, were among the principal witnesses for the railroads.

STATE COMMISSIONS

The hearing before the Texas Railroad Commission on the application of the railroads of the state for a general increase in freight rates which has been in progress for several weeks at Austin, Tex., was concluded on September 30.

The Railroad Commission of Montana has ordered reductions in the rates for transportation of slack coal from the Bear creek district over the Montana, Wyoming & Southern, and the Northern Pacific. For different distances the rates on slack coal must be from 10 to 25 cents lower than those on lump coal.

The New York State Public Service Commission, Second district, in an opinion by Commissioner Carr, has refused to authorize the discontinuance of passenger service on the Mahopac Falls Railroad, operated by the New York Central as a branch of the Harlem road, though it appears that such passenger operation is at a loss. It is held that the commission is without power to permit a railroad corporation to cease to perform the functions for which it was chartered. Commissioner Carr points out that, while the commission is without power to permit the railroad to discontinue service, called for in its charter, should trains be taken off, a complaint would then bring squarely before the commission the question of whether or not the road was rendering adequate service.

The Maryland Public Service Commission, in an opinion by Commissioner Henry, has dismissed the application of the Chesapeake & Curtis Bay Railroad for authority to exercise its franchise to operate its short railroad on the northerly side of Curtis Bay, Baltimore, and to issue $50,000 capital stock. The commission finds that there is no public necessity for the road. The track lies entirely on the land of the United States Asphalt Refining Company, and the line is operated as a plant facility by that company. The cost of operation is about $18,000 a year, and the commission finds that the asphalt company is proposing to incorporate as a common carrier mainly or wholly for the purpose of securing through freight rates with the Baltimore & Ohio and other roads. Commissioner Henry says that the industries in that section already have ample facilities and another common carrier should not be established; it is "better to hold to strict accountability responsible carriers, capable of meeting the reasonable requirements of business, than to try to establish conditions whereby such carriers may be forced to divide rates with mere plant facilities, incapable of general service, and which can only live by sapping the vitality of other roads."

Report on Phoenixville Accident

John P. Dohoney, investigator of accidents, has made his report to the Pennsylvania Public Service Commission on the accident in a tunnel on the Philadelphia & Reading, at Phoenixville, Pa., September 28, when nine workmen were killed and nine others injured. The work train, on which these men were employed, had just entered the tunnel, on the southbound track, and had stopped when a southbound passenger train, running on the northbound track, and moving at about ten miles an hour, ran into the men, who were walking along the track and, as it appears, struck more than one-third of the gang of fifty. The principal explanation given is that the conductor of the work train had given proper notice or instructions to the foreman and the workmen before entering the tunnel; but the State inspector says that this notice, if heard at all, was misunderstoood; and that a written order should have been given to the foreman, explaining the proposed movement. The workmen were all foreigners, mostly Italian. They had been engaged for two weeks in the work of widening the tunnel.

PERSONNEL OF COMMISSIONS

J. H. Prior, assistant chief engineer of the Illinois Public Utilities Commission, has been appointed chief engineer of that commission, with headquarters at Springfield, Ill. Mr. Prior received his education at the Armour Institute of Technology and at the University of Chicago. From 1905 to 1914 he was engineer of design of the Chicago, Milwaukee & St. Paul, including its Puget Sound extension, with headquarters at Chicago. In that capacity he made two of the earliest valuations of railroad properties required by State authorities, these being valuations of the structures of the St. Paul in Minnesota in 1906 and in South Dakota in 1907. His present appointment dates from September 9.

J. H. Prior

COURT NEWS

In the United States District Court at New York City, October 4, the Grand Jury returned an indictment against the Delaware, Lackawanna & Western charging violation of law in failing to collect demurrage on coal consigned to the Delaware, Lackawanna & Western Coal Company. The shipments on which the indictment is based were made between October, 1912, and October, 1914, and the demurrage charges involved amount to $298.

"Passenger"

The Pennsylvania Supreme Court holds that a workman who boards a laborers' train without permission for the purpose of securing employment is not a passenger and cannot recover for injuries sustained by reason of a defective handlebar.—Schifalacqua v. Atlantic City R. Co. (Pa.), 95 Atl. 260.

Hours of Service—Offices "Continuously" Operated

The Circuit Court of Appeals, Sixth Circuit, holds that a telegraph office operated from 4:30 a. m. to 9:30 p. m., subject to negligible intermissions, and a telegraph office operated from 6:30 to 11 p. m., subject to negligible intermissions, are not offices operated only during the daytime, but are offices operated during the day and night, within the hours of service act.—United States v. Grand Rapids & Indiana (C. C. A.), 224 Fed. 667.

Reasonable Notice of Claim Always Essential

In an action for damages to a shipment of livestock under a contract providing that any claim for damage should be made within five days, it was undisputed that the damage to the stock was not ascertainable within that time, and it was held by the South Carolina Supreme Court that the stipulation was unreasonable and void. But that fact did not excuse the shipper from giving reasonable notice. The question of whether reasonable notice was given, the facts being undisputed and susceptible of only one reasonable inference, was a question of law for the court. The mere fact that the railroad company's veterinary surgeon examined the stock and reported the result of his examination to one of the company's officers was not enough to warrant a reasonable inference of a waiver of the stipulation.—Crawford v. Southern Ry. Co. (S. C.), 86 S. E. 19.

Injury to Freight from Inherent Qualities—Presumptions

Injury from inherent qualities, the Georgia Court of Appeals holds, is somewhat in the nature of damage resulting from the act of God; and in the more recent development as to the rules in regard to the liability of carriers it has been held that they are not liable for loss or damage due to the inherent qualities of the goods carried. When the goods composing a shipment are of such intrinsic character as to be self-destructive, or incapable of safe transportation, the presumption that damage which accrues in the course of the transportation was due to the negligence of the carrier is rebutted by showing that the damage was due to the inherent qualities of the shipment. It is only when it is shown that the carrier actually receipts for a shipment as in good order that the presumption becomes conclusive.—Capital City Oil Co. v. Central of Georgia (Ga.), 86 S. E. 57.

Crossing Accident—Contributory Negligence

The California Supreme Court holds that a person approaching a track, which is itself a warning of danger, must take advantage of every reasonable opportunity to look and listen. He has no right to depend upon the custom of enginemen to give appropriate signals, or even upon a duty to give such signals enjoined by law. The driver of a motor car, on a clear afternoon, approached a crossing, and came to a stop about 35 ft. from the track, where obstructions made it impossible to see trains approaching. Hearing no noise and seeing no smoke, he started to cross the track on a down-grade, and first saw a train at a point about 17 ft. from the rail, the first point at which his view in that direction was unobstructed. He then endeavored to stop his car and was struck. It was held that he was guilty of contributory negligence as a matter of law, and could not recover for his injuries.—Griffin v. San Pedro, L. A. & S. L. (Cal.), 151 Pac. 282.

Hours of Service—"Emergency"—Telegraph Operator

An operator of the Atlantic Coast Line working from 4 p. m. until midnight at a continuously operated office at Kenly, N. C., was subpoenaed as a witness in an action tried on May 26, and obtained permission from the chief despatcher at Rocky Mount to obey the subpoena, with the understanding that he would return to Kenly about 2:30 p. m. The case was not reached for trial until about 4 p. m., and about 1 p. m. the operator wired the despatcher that he would be delayed; and the next train from Rocky Mount to Kenly did not reach Kenly until 10 p. m. The operator reached Kenly about 7:30 p. m. but, when requested to return to duty, reported that he was sick. One of the other operators therefore worked from 8 a. m. until 8 p. m., and the other from 8 p. m. until 8 a. m. on the morning of the 27th. The Federal District Court, E. D., North Carolina, holds that the excessive hours of the first of these operators was due to an emergency, and the railroad was not liable for the statutory penalty. "Emergency" it held to be synonymous with "exigency," meaning something arising suddenly, out of the current of events; any event or occasional combination of circumstances calling for immediate action or remedy; a pressing necessity; a sudden and unexpected happening, or an unforeseen occurrence or condition. But as it did not appear that the chief despatcher was not promptly notified that the operator was sick, and there was no suggestion that he did not have an extra operator at Rocky Mount, it was held that there was no emergency or casualty excusing the company's act in allowing the second operator to work three hours, on the morning of the 27th, more than the hours allowed by statute.—United States v. Atlantic Coast Line Co., 224 Fed. 160.

Width of Roundhouse Doorway

An engineer and hostler at a roundhouse attempted to mount a moving engine which was being brought out by his fireman at a point from three to eight feet within the doorway, and was caught between the tender and the doorway and killed. The engine was of the large modern type, and the clearance between its overhang and the side of the doorway was but eight inches, while in newer roundhouses a larger clearance was provided. The deceased was not directed nor required to mount the engine at that point, and the danger of doing so was obvious. In an action for his death the Circuit Court of Appeals, Second Circuit, held that the width of the doorway being sufficient for all ordinary and proper uses, the railroad was not chargeable with negligence because it was not made wider.—Hogan v. New York Central (C. C. A.), 223 Fed. 890.

Hours of Service—Station Agent Acting as Telegrapher

A railroad company discharged one of its three operators at a station operated continuously, and after making inquiries to obtain an additional operator, instructed the station agent to work three hours a day as agent, and six hours as telegraph operator, and that he should not work in excess of nine hours. The agent found himself required by the exigencies of the situation to work 12 hours a day as agent in addition to 5 hours as operator. The Circuit Court of Appeals, Ninth Circuit, holds this to be a violation of the hours of service statute, as the agent was within the prohibition of the statute, and under the circumstances it was not a harsh application of the statute to hold that the company had knowledge of all the acts of all its officers and agents, especially as it would seem that it was charged with actual knowledge of the agent's excessive service.—Oregon-Washington R. & N. Co. v. United States (C. C. A.), 233 Fed. 596.

Revocation of License to Use Waiting Room

In an action for injuries in being ejected from a waiting room, it appeared that plaintiff went to the station between one and two a. m., and found, on offering to buy a ticket, that the first available train left at seven a. m., and that the ticket agent had left for the night. Plaintiff said that the telegraph operator, who was in charge of the station, told him that he could remain in the waiting room until the train was due, but that within an hour he told him that it was against the rules of the company for him to remain there, and ordered him out, using profane language. Going out in the dark, he walked off the unlighted platform on to the track and was injured. The telegraph operator told another story, but for the purposes of the case the plaintiff's testimony was considered. The Alabama Supreme Court held that the company was properly allowed to prove an order of the Alabama Railroad Commission requiring station rooms to be open at least an hour before train time. That order established, prima facie, at least, one hour as a reasonable time. It was held that the plaintiff was entitled only to such provision as the law required for the general public. He had no right to expect or demand the use of the company's waiting room for five or six hours in advance of the departure of the first train on which he could take passage. Although he had been allowed to remain in the room, that indulgence was a mere license, which might be withdrawn at any time, provided there was no trenching upon the reasonable time which must be allowed to persons intending to become passengers. For the agent, in revoking the plaintiff's license, which he had a right to do, to swear at him, was no assault; it might be considered as a grievous breach of good manners, but was not an injury for which the law undertakes to furnish redress, at least in an action counting solely on bodily injuries. For the injuries from falling off the platform the railroad was not liable, the plaintiff being merely a licensee.—Widener v. Alabama Great Southern (Ala.), 69 So. 558.

Railway Officers

Executive, Financial, Legal and Accounting

A. L. Burford has been appointed assistant general attorney of the St. Louis Southwestern, with headquarters at St. Louis, effective October 1.

Theodore F. Brown, assistant auditor of the Star Union Line at Pittsburgh, Pa., was retired on a pension on September 1, after nearly 53 years' service.

L. F. Linney has been appointed auditor of the Pacific & Idaho Northern, with headquarters at New Meadows, Idaho, vice T. Cox, resigned. Effective October 1.

C. E. Schaff, receiver of the Missouri, Kansas & Texas, announces the following appointments: C. N. Whitehead, vice-president, as assistant to the receiver; W. A. Webb, vice-president in charge of operation, chief operating officer; C. Haile, vice-president in charge of traffic, chief traffic officer; G. T. Cutts, controller, chief accounting officer; Frank Johnson, general treasurer, treasurer for the receiver; E. T. Nelson, treasurer in Kansas, assistant treasurer and paymaster for the receiver; J. B. Barnes, assistant secretary and assistant treasurer, agent for the receiver. J. M. Bryson retains his position as general counsel. All of these officers will have headquarters at St. Louis, Mo., except W. A. Webb, whose office is at Dallas, Tex.; E. T. Nelson, whose office is at Parsons, Kan., and J. B. Barnes, whose office is at New York, N. Y.

Operating

The title of E. W. Grice, assistant to president of the Chesapeake & Ohio at Richmond, Va., has been changed to general superintendent of transportation.

George B. Johnson, superintendent of the joint track division of the Texas & Pacific at Ft. Worth, Tex., has been appointed chief despatcher of the new Ft. Worth division with headquarters in the same city.

Clarence C. Beeth, whose appointment as superintendent of the Eastern division of the El Paso & Southwestern has been announced in these columns, was born on October 5, 1874, at Muncie, Ind. He enjoyed a common school education, and on January 1, 1890, entered the employ of the Atchison, Topeka & Santa Fe. He remained with this road successively as telegraph operator, agent, train despatcher and chief despatcher until January 1, 1909, when he resigned as chief despatcher at Dodge City, Kan., to become trainmaster of the El Paso & Southwestern at Tucumcari, N. M. He remained in this position until September 1, 1915, when he was promoted to superintendent of the Eastern division, with headquarters at the same place.

H. Hulatt has been appointed manager of telegraph of the Grand Trunk and the Grand Trunk Pacific, vice A. B. Smith, resigned on account of ill health. Mr. Hulatt will report to the vice-president in charge of operation of the Grand Trunk at Montreal, Que., and to the vice-president and general manager of the Grand Trunk Pacific at Winnipeg, Man. Mr. Hulatt was born in London, Eng., and entered the service of the Grand Trunk Pacific in 1907, and was Mr. Smith's principal assistant in the construction of the Grand Trunk Pacific telegraph lines. In January, 1913, he was appointed commercial and traffic superintendent of the telegraph department, with headquarters at Winnipeg, in charge of lines west of Fort William, Ont.

Traffic

Leo Feit, chief clerk of the freight department of the Wheeling & Lake Erie at Cleveland, Ohio, has been appointed chief of the tariff bureau.

S. Y. Henderson, commercial agent of the Ocilla Southern at Hawkinsville, Ga., has been appointed general freight and passenger agent, with headquarters at Hawkinsville.

H. McFarlane has been appointed assistant traffic manager of the Pacific & Idaho Northern, with headquarters at New Meadows, Idaho, vice E. D. Perkins, resigned. Effective October 1.

Edward F. Lee, soliciting freight agent of the Western Maryland at Baltimore, Md., has been appointed commercial agent with office at Baltimore, succeeding C. B. Oakley, who has been transferred to St. Louis.

Frank Wisner Robinson, whose appointment as traffic manager of the Oregon-Washington Railroad & Navigation Company was announced last week, was born at Cherryville, Kan., on May 22, 1874. He entered railway service on April 1, 1889, and until September, 1899, was employed in the passenger and freight accounting departments of the Union Pacific. From September, 1899, to January 1, 1906, he was in the freight traffic department of that road at Omaha, Neb.; from January 1, 1906, to January 1, 1910, he was chief clerk to the director of traffic of the Union Pacific - Southern Pacific System at Chicago; from January 1 to August 1, 1910, assistant general freight agent of the Oregon-Washington Railroad & Navigation Company at Portland, Ore.; from August 1, 1910, to May 15, 1912, general freight agent of the same road; from May 15, 1912, to February 20, 1913, assistant to director of traffic of the Union Pacific-Southern Pacific System, and from February, 1913, to November 1, 1915, assistant traffic manager of the Oregon-Washington Railroad & Navigation Company.

F. W. Robinson

Russell S. Underwood, formerly manager of the Mount Jewett Route, operated by the Baltimore & Ohio and the Erie, has been appointed special representative of the freight department of the Baltimore & Ohio, with headquarters at Baltimore, Md.

R. F. Hill has been appointed assistant general freight and passenger agent of the Toronto, Hamilton & Buffalo with office at Hamilton, Ont. He entered the service of this company in July, 1906, and served in the office of the master mechanic at Hamilton until the following September, when he was transferred to the general freight and passenger agent's office. He subsequently served for three years as stenographer and then consecutively as soliciting freight agent and rate clerk. In May, 1915, he was appointed chief clerk and now becomes assistant general freight and passenger agent of the same road as above noted.

Engineering and Rolling Stock

F. O. Haymond, superintendent of the Bingham & Garfield, with headquarters at Magna, Utah, has been appointed also assistant superintendent of the motive power and car departments.

W. B. Combs, master mechanic of the Macon, Dublin & Savannah, at Macon, Ga., having resigned to accept service with the government, the office of master mechanic has been abolished, and L. B. Jones has been appointed general foreman in charge of the mechanical department.

Curtis C. Westfall has been appointed engineer of bridges of the Illinois Central, with headquarters at Chicago, vice Maro Johnson, engineer of bridges and buildings, assigned to special work. Frank R. Judd has been appointed engineer of buildings, with headquarters at Chicago. Effective October 1.

A. C. Watson, division engineer of the Pennsylvania Lines West with headquarters at Logansport, Ind., has been appointed division engineer of the Cleveland & Pittsburgh division with headquarters at Cleveland, vice E. F. McCrea, deceased. J. K. Sherman, assistant engineer at Pittsburgh, has been appointed division engineer with headquarters at Zanesville, Ohio, vice W. E. Guignon, transferred. Effective October 1.

Frederick Knight Bennett, recently appointed valuation engineer of the Minneapolis & St. Louis, with office at Minneapolis, Minn., entered railway service in the spring of 1895 as rodman on the Lehigh Valley. He was continuously in the service of this road until March, 1909, as assistant engineer on maintenance, assistant engineer, engineering department, assistant engineer in charge of office and accounts, supervisor of tracks, and division engineer. From March, 1909, until June, 1911, he was engineer in charge of reconstruction on the Missouri Pacific; from June, 1911, to June, 1912, he was assistant engineer with the engineer maintenance of way of the same road, at Kansas City, Mo.; from June, 1912, to June, 1913, assistant engineer with the chief engineer at St. Louis, Mo.; June, 1913, to June, 1914, division engineer of the Missouri, Kansas & Texas; June, 1914, to March, 1915, assistant engineer of valuation of the Great Northern, at St. Paul, Minn., and Spokane, Wash.; March, 1915, to September 1, 1915, division supervisor of the Minneapolis & St. Louis, eastern division.

F. K. Bennett

Purchasing

William D. Stokes has been appointed assistant general storekeeper of the Illinois Central, with headquarters at Memphis, Tenn., vice William S. Morehead, transferred. Mr. Morehead has been appointed division storekeeper at McComb, Miss., vice Frank P. Dugan, transferred. Mr. Dugan has been appointed division storekeeper at Vicksburg, Miss., vice Eugene D. Meissonnier, resigned. Appointments effective October 1.

OBITUARY

B. E. Rice, general industrial agent of the Norfolk Southern with office at Norfolk, Va., died on September 27, at Washington, D. C., at the age of 58.

Lowell M. Palmer, of Brooklyn, N. Y., who died at Stamford, Conn., September 30, at the age of 70, was prominently identified with transportation for many years, having been proprietor of important freight terminal docks in Brooklyn. He was also engaged in lightering, and it is said that it was his boat line that first carried freight cars by floats to Brooklyn.

The Manila Railway.—All the steam railway lines in Luzon are owned and operated by the Manila Railway Company. From the report of its annual meeting in London it appears that the operations during the last fiscal year showed a decreased revenue. This is attributed primarily to the short rice crop, which reduced the freight business directly and to the European war, which affected both the freight and passenger business by limiting the spending power of the agricultural population. At the same time there was an increase in operating expenses, mainly owing to the opening of traffic over a considerable mileage of new line. The company has contracts with the Philippine Government for the construction of several new lines, with a guarantee of the bond issues; and work on certain of these lines had reached sections which could not be remunerative in themselves and would be chiefly sources of expense until the portions of the lines beyond them were completed and opened. Since the beginning of the war, moreover, it had been impossible to sell the guaranteed bonds, and the company therefore determined for the present to reduce its construction to the minimum necessary to link up certain sections as yet disconnected, an arrangement which was agreed to by the Philippine Government. In spite of these difficulties the report emphasizes the fact that the financial situation of the company is in general quite satisfactory.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Central of Georgia is inquiring for prices on 8 Mikado type and 4 Pacific type locomotives.

The Sioux City Terminal has ordered one six-wheel switching locomotive from the American Locomotive Company. This locomotive will have 19 by 24 in. cylinders and a total weight in working order of 117,000 lb.

The Illinois Central, reported in the *Railway Age Gazette* of September 10 as inquiring for prices on 50 Mikado type locomotives, has changed its inquiry to 47 Mikado type locomotives and 3 Santa Fe type locomotives for hump yard switching service.

The Chicago Junction has ordered two superheater six-wheel switching locomotives from the American Locomotive Company. These locomotives will have 20 by 26 in. cylinders, 51 in. driving wheels, a total weight in working order of 149,000 lb., and a steam pressure of 180 lb.

CAR BUILDING

The Atlantic Coast Line is in the market for 200 40-ton flat cars.

The Missouri, Kansas & Texas is inquiring for 50 steel underframes.

The Erie has ordered 200 automobile cars from the Pressed Steel Car Company.

The Russian Government is reported to be contemplating the purchase of 7,000 freight cars.

The Tennessee Copper Company is in the market for 12 50-ton steel underframe flat cars.

The American Steel & Wire Company has ordered 50 tank cars from the German-American Car Company.

The Campbell's Creek Coal Company has ordered 100 gondola cars from the American Car & Foundry Company.

The Emlenton Refining Company, Emlenton, Pa., has ordered 100 gondola cars from the American Car & Foundry Company.

The New York Central is reported to have ordered 500 freight cars for the Michigan Central from the Haskell & Barker Car Company, in addition to a similar order for a like number of cars reported in the *Railway Age Gazette* of August 20.

The Wheeling & Lake Erie has ordered 750 gondola cars from the Standard Steel Car Company, and 200 steel automobile cars from the Western Steel Car & Foundry Company. These cars were incorrectly reported in last week's issue as having been ordered by the Western Maryland.

IRON AND STEEL

The Boston & Maine is in the market for 25,000 tons of rails.

The Chicago & North Western has ordered 15,000 tons of rails from the Illinois Steel Company.

The Baltimore & Ohio has ordered from 10,000 to 15,000 tons of rails from the Pennsylvania Steel Company.

The Nashville, Chattanooga & St. Louis has ordered 8,000 tons of rails from the Tennessee Coal, Iron & Railroad Company.

The Southern has ordered 10,000 tons of rails from the Tennessee Coal, Iron & Railroad Company, and 2,000 tons from the Pennsylvania Steel Company.

The Interborough Rapid Transit has ordered 200 tons of steel from Levering & Gerrigues, for a subway station at Long Island City.

Supply Trade News

H. G. Prout has resigned from his position as president of the Hall Switch & Signal Company.

The directors of the Westinghouse Air Brake Company have declared the regular quarterly dividend of $2 a share.

The Cincinnati Screw Company, Twightwee, Ohio, has purchased the plant and equipment of the Cincinnati Screw & Tap Company, and will start full operation shortly.

The Gibraltar Manufacturing Company, which for the last two years has had a selling arrangement with Mason, Davis & Co. for the sale of the Gibraltar bumping post, has terminated that arrangement and opened offices at 332 Monadnock Block, Chicago, where it will handle this business on its own account.

Robert E. Belknap, district sales manager of the Pennsylvania Steel Company at Chicago, has been transferred to the New York office as district sales manager, succeeding R. W. Gillespie, recently appointed general manager of sales. Thomas Blagden, Jr., has been appointed assistant sales manager at New York, and R. W. Reid, who has been assistant sales manager in the New York district, has been appointed district sales manager at Steelton, Pa.

Charles M. Schwab, president of the Bethlehem Steel Company, is understood to be negotiating with the directors of the Pennsylvania Railroad for the purchase of the latter's controlling interest in the Pennsylvania Steel Company. A conference was held in New York on Tuesday, but none of the details have been made public. On January 1, 1915, the outstanding stock of the Pennsylvania Steel Company consisted of $20,560,800 preferred and $10,750,000 common. The Pennsylvania Company (Pennsylvania Lines West) on December 31, 1914, owned $9,158,300 of the preferred and $7,388,900 of the common. The steel company is a New Jersey corporation. It controls: the Pennsylvania Steel Company of Pennsylvania, which operates a plant at Steelton, Pa., for the manufacture of rails, railway materials, structural work; the Maryland Steel Company, operating a plant at Sparrow's Point, Md.; the Penn-Mary Coal Company, and the Spanish-American Iron Company owning ore properties in Cuba.

The Westinghouse Electric & Manufacturing Company announces the following awards received at the Panama-Pacific Exposition: The grand prize on the 4,000 hp., 650-volt d.c. double unit Pennsylvania electric locomotive mounted on a turntable under the dome of the Transportation Palace. The medal of honor on alternating current and direct current industrial motor and control apparatus, on precision instruments, on Le Blanc condensers, on motor-generator sets for moving picture machines and on high voltage oil switches. The gold medal on a number of different classes of apparatus among which are steam turbines, alternating and direct current generators, alternating and direct current railway motors, transformers, rectifiers, starting, lighting and ignition systems, switchboards and accessories, and mining locomotives. The Westinghouse Electric & Manufacturing Company was also awarded the gold medal for the most complete and attractive installation in the Palace of Transportation. It also received a number of silver and bronze medals.

Alva C. Dinkey, president of the Carnegie Steel Company, has resigned from that position to become president of the Midvale Steel Company. Mr. Dinkey has been in the steel business for something like 36 years. He was born at Weatherly, Pa., on February 20, 1866, and received his education in the public schools of Weatherly and Braddock. On May 21, 1879, he became a water boy in the Edgar Thompson Steel Works, remaining in these works until 1885 when he secured a position as machinist with the Pittsburgh Locomotive Works, Allegheny, Pa. From 1889 to 1893 he served as secretary to the superintendent of the Homestead Steel Works of the Carnegie Steel Company. In 1893 he was made electrician and in 1898 superintendent of the electric light and power plant. The following year he was appointed assistant to the general superintendent of the Homestead works, succeeding to the position of general superintendent in 1901. On August 1, 1903, he was elected president of the Carnegie Steel Company and has occupied that position up to the present time. Mr. Dinkey is a member of the American Society of Electrical Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers and a number of other important societies.

The Midvale Steel & Ordnance Company was incorporated in Delaware on October 5 with a capital stock of $100,000,000 to engage in the manufacture of iron, steel and all other metals and articles of commerce manufactured out of such metals, to buy and sell firearms, shrapnel, ordnance and ammunition of every kind and description, to buy, sell, manufacture and deal generally in articles of machinery used in the manufacture of ordnance and ammunition, and to produce ores and minerals and manufacture and deal in the products and by-products thereof. The incorporators were: Herbert E. Latter and Norman P. Coffin of Wilmington, Del., and Clement M. Egner of Elkton, Md. The capital stock of the new company will be issued in $2,000,000 shares of only one class of $50 par value. Of the total of $100,000,000, $70,000,000 will be issued to provide working capital and to purchase over 98 per cent of the capital stock of the Midvale Steel Company, Nicetown, Pa.; all of the capital stock of Worth Brothers, Coatesville, Pa.; all of the property and business of the Coatesville Rolling Mill Company, and all the capital stock of the Remington Arms Company, of Delaware (a separate organization from the Remington Arms & Ammunition Company, Ilion, N. Y.), which is working on a contract of 2,000,000 rifles for the British Government at Eddystone, Pa. The company has also under option 300,000,000 tons of iron ore. The following are the directors and officers of the Midvale Steel & Ordnance Company: Directors—William E. Corey, Albert H. Wiggin, Samuel F. Pryor, Ambrose Monell, Frank A. Vanderlip, Alva C. Dinkey, Samuel M. Vauclain, William P. Barba, Percy A. Rockefeller, Charles H. Sabin, Marcellus Hartley Dodge and Frederic W. Allen. Officers—president, W. E. Corey; vice-president, A. C. Dinkey; secretary and treasurer, William B. Dickson.

The Carnegie Steel Company

Homer D. Williams, general superintendent of the Duquesne Steel Works, has been elected president of the Carnegie Steel Company, succeeding Alva C. Dinkey, resigned to become president of the Midvale Steel Company, and William Whigham, formerly assistant to the president of the Carnegie Steel Company, has been elected a vice-president. Edward Hamilton, assistant general superintendent of the Duquesne Works, succeeds Mr. Williams as general superintendent.

Mr. Williams, the new president of the company, has been in the steel business since 1880. He was born at Johnstown, Pa., on August 19, 1863, and was educated in the public schools at that place. In 1880 he entered the laboratory of the Cambria Steel Company as a carbon boy. In 1885, however, he left to take a special course at Lehigh University in chemistry and metallurgy. For a short period he was chemist in the Joliet Works of the Illinois Steel Company and for two years chemist at the Colby Mine at Bessemer. He later served five years as superintendent of the Bessemer department and rail mill of the Colorado Fuel & Iron Company. In 1897 he entered the service of the Maryland Steel Company, but in 1899 was placed in charge of the Bessemer department of the Homestead Steel Works of the Carnegie Steel Company. In 1902 he became general superintendent of the works, but in 1903 was transferred to a similar position at the Duquesne Steel Works and it is the latter position he leaves to take up his new duties.

Mr. Whigham has served as assistant to the president of the Carnegie Steel Company since 1905. He was born at Camden, Pa., on January 4, 1866, and graduated from Stevens Institute of Technology with the degree of mechanical engineer in 1888. In 1890 he became a draftsman with Thomas Carlin's Sons, Allegheny, Pa., in 1892 taking a similar position with Julian Kennedy and later with the Carnegie Steel Company. In 1897 he became steam engineer of the Homestead Works of the company and in 1901 superintendent of the Howard Axle Works. In 1905, as noted above, he was made assistant to the president of the company.

Railway Construction

Arkansas Roads (Electric).—Surveys are being made, it is said, to build an electric line from Guion, Ark., north to Melbourne, about 10 miles. A. C. Veach, Gravette, Ark., is the promoter.

Atchison, Topeka & Santa Fe.—The Railroad Commission of the state of California on September 20 ordered this company to build a standard-gage line, connecting the gap between Temecula, in Riverside county, Cal., and Oceanside, in San Diego county. Such a line would provide direct rail connection between San Bernardino, Riverside, and the interior of Riverside county and the port of San Diego. The commission suggests two routes which may be followed, one from Temecula to Fallbrook, 12 miles, and the other from Temecula via Rainbow Valley to Oceanside, 33 miles.

Beaver, Mead & Englewood.—The grading on this road has been nearly completed, and the track laying, now in progress, is about three-fourths done. The railway when completed will extend from Forgan, Okla., in a southerly direction to Beaver. The maximum grade is 1 per cent, and there are three bridges, one 14-ft. frame structure, which has been completed, a 70-ft. piling bridge, and a 350-ft. pile trestle. The Beaver Construction Company, of Beaver, is doing the work. A locomotive and a combination coach and box car have been purchased. L. A. Walton, Beaver, Okla., chief engineer.

Belleview & Western.—This company has been incorporated to build a railway from Graniteville, Mo., to Belleview, a distance of about three miles. Capital, $40,000; among the incorporators are William R. Orthwein and Louis Hudson, of St. Louis, and J. H. Long, of Belleview.

Chicago, Milwaukee & St. Paul.—This road is filling in 14,000 ft. of timber trestles between Seattle, Wash., and Tacoma. The work is being done by company forces and will require 215,000 cu. yd. of fill.

Cincinnati, New Orleans & Texas Pacific.—According to press reports, surveys are now being made for carrying out double tracking work between Somerset, Ky., and Flat Rock. (July 23, p. 181.)

Long Island Railroad.—This company has applied to the New York Public Service Commission, First district, for permission to build and operate a two-track branch line from Flushing, Long Island, to Creedmore, in the borough of Queens, 5.4 miles. The company has also asked the commission to determine the manner in which the proposed line shall cross certain streets and the tracks of a surface car line. The new branch will provide a more direct route from the borough of Manhattan to Creedmore than by the existing branch line, which leaves the main line at Floral Park.

The Woodside-Winfield cut-off, in the borough of Queens, which was built by the Long Island, to eliminate a number of grade crossings, besides improving the alinement by cutting out 150 degrees of curvatures, will be put in operation on October 17.

Midland & Northwestern.—Residents of Midland, Tex., have entered into an agreement with the Texas & Pacific, it is said, to build a railway from Midland northwest to Seminole, 60 miles. The Texas & Pacific is to furnish the rails and equipment, and T. J. O'Donnell, banker and stockman of Midland, and associates are to furnish the right of way and provide all labor for the construction of the proposed line, which is to be operated by the Texas & Pacific. The town of Midland has raised a bonus of $100,000 in aid of the project and other large donations will be made by the towns of Andrews, Shafter Lake and Seminole.

Norfolk & Western.—A contract has been let recently to J. J. Boxley & Co., Roanoke, Va., for double tracking two miles of this road between Berton, Va., and Eggleston, on New river, and the work has already been started.

Savannah & Northwestern.—Surveys are reported being made for a proposed extension from St. Clair, Ga., northwest to either Thomson, Camak or Norwood, about 30 miles. The company now operates a line from Savannah northwest to St. Clair, 108.6 miles.

South Carolina Roads (Electric).—According to press reports, the Chamber of Commerce of Sumter, S. C., is interested in a project to build a line from Sumter, S. C., east to Shiloh, thence via Turbeville to Olanta, about 32 miles. E. I. Reardon, Sumter, is secretary of a committee in charge of surveys, rights of way, etc., and R. F. McLellan is chief engineer.

Southern Railway.—Contracts for double tracking work on additional sections of this road were let recently, it is said, as follows: To W. W. Boxley & Co., Roanoke, Va., for the section from Arrowhead to Elma, 20 miles; to the Hall-Crawford Construction Company, Macon, Ga., for the section from Sycamore to Gretna, 4 miles, and to Robert Russell, Danville, Va., for the section from Whittle to Dry Fork, 9.7 miles. (October 1, p. 622.)

Texas Roads.—Arrangements are being made, it is said, to build a line from Ballinger, Tex., where a connection is to be made with the Gulf, Colorado & Santa Fe west to a crossing of the Kansas City, Mexico & Orient at Bronte, thence to Robert Lee, about 40 miles. T. H. Wheelis, Chicago, Ill., and associates are said to be back of the project.

Torrington-Thomaston Traction.—Incorporated with $300,000 capital to build from Torrington, Conn., south to Thomaston, 10 miles. H. Mann, president, Torrington; H. M. Guernsey, vice-president, Thomaston, and G. B. Goodwin, treasurer, Torrington.

RAILWAY STRUCTURES

Albany, N. Y.—The Delaware & Hudson Company, co-operating with officers of the city in plans to beautify "The Plaza" has notified the mayor of its willingness to put up an addition, 184 feet long, to its large new office building. The extension is designed to be built south of the large central tower, and to be five stories high, corresponding to the architectural design of the present structure. It will cost about $225,000.

Aurora, Ill.—The new terminal building of the Aurora, Elgin & Chicago (Electric), at Main street and Broadway, has been opened. The South Broadway transfer station has been discontinued and all transferring from interurban to city cars is now done in the new station. The sixth floor of the building is occupied by the general offices of the company, which were moved here from Wheaton, Ill. The second, third, fourth and fifth floors have been sublet as office suites.

Baltimore, Md.—The Pennsylvania Railroad has given a contract to Arthur McMullin, New York, for building the new concrete pier at Canton, Md. The improvements will cost about $200,000. (Aug. 27, p. 409.)

Cleveland, Ohio.—The New York Central, Pennsylvania Lines, Cleveland & Pittsburgh and the Cleveland, Cincinnati, Chicago & St. Louis have accepted the ordinance providing for the erection of the proposed new union passenger terminal.

Deshler, Ohio.—The Baltimore & Ohio and the Cincinnati, Hamilton & Dayton are building a joint passenger station here, which will cost approximately $10,125. The building is in the process of construction, and is about half done. George Georgenson, Hamilton, Ohio, contractor. (Sept. 3, p. 449.)

Evansville, Ind.—The Illinois Central will soon let a contract for the construction of a two-story freight house here. It will be a brick structure, 40 ft. by 170 ft., with a basement under part of the building, and office room on the second floor. The present freight house, a frame building, will be extended 100 ft.

Freeport, Ill.—The Illinois Central has let the contract for three washroom buildings (mentioned last week), and a pump house, to T. S. Leake & Co., of Chicago. The buildings will be one-story structures with brick walls, concrete floors and composition roofs. In compliance with the state law similar buildings have been put up at East St. Louis, Ill., and Clinton, and are now in the course of construction at Carbondale and Burnside (Chicago). The largest structures will be two two-

story buildings at Burnside, with facilities for 1,500 and 1,000 men, respectively, dimensions of 53 ft. by 95 ft. and 43 ft. by 86 ft. Each of the other three points has or will have two buildings, except East St. Louis, which has a third building which was remodeled from a frame structure. The Drumm Construction Company, of Chicago, did the work at East St. Louis, the Harbeck Company had the contract at Clinton, and is doing the work at Carbondale, and Joseph E. Nelson & Sons, of Chicago, have the contract for the buildings at Burnside.

Ft. Wayne, Ind.—The municipality has let a contract to the Moellering Construction Company of this city for its portion of the work to be done in the elevation of tracks over Osage street. The estimated cost of the work is $26,850. The New York, Chicago & St. Louis and the Lake Shore & Michigan Southern will do their part of the work with company forces, at an approximate cost of $66,737 to the former road and $17,400 to the latter.

Macon, Ga.—The Central of Georgia has given a contract to the Virginia Bridge Company for fabricating and erecting a steel viaduct over the tracks of the Georgia Southern & Florida, also over Fourth, Fifth, Hazel and Ash streets, Macon. The structure will include one 60-ft. deck span, one 45-ft., thirty-five 30-ft., thirteen 20-ft. deck spans and three 45-ft. through spans on steel bents, and will require about 935 tons of structural steel. The work includes about 1,400 cu. yd. of plain concrete masonry, 100 cu. yd. of reinforced concrete, and 120,000 ft. board measure of timber and ties. The total estimated cost of the whole, including tracks, filling, etc., will be about $165,000.

Marshall, Tex.—Fire destroyed the coach and paint shop, a storeroom and several passenger coaches and freight cars of the Texas & Pacific on October 1.

Nonconnah, Tenn.—The Illinois Central will build a steel structure, 176 ft. by 1,200 ft., equipped for repairing wooden cars. The contract for the construction work has not yet been let, but about 1,000 tons of steel have been ordered from the American Bridge Company.

Philadelphia, Pa.—The Pennsylvania Railroad has given a contract to the McNichol Paving & Contracting Co., for building a 1,500-ft. concrete retaining wall on the north side of Lehigh avenue, from Tulip to Aramingo streets, in Philadelphia.

A contract is reported let by the Department of Public Works to Peoples Brothers at $34,500 for building a bridge on the line of Fifty-fourth street over the tracks of the Philadelphia, Baltimore & Washington. It is to be a reinforced concrete structure, 60 ft. wide and 146 ft. between abutments. The Pennsylvania Railroad will pay part of the cost of this bridge.

Vancouver, B. C.—Work on the Vancouver terminals of the Canadian Northern Pacific is now under way. To date 2,000,000 yd. out of a total of 3,250,000 to be reclaimed at the head of False creek have been filled in. Bids are being received on a reinforced concrete sea wall, which will be built to close the head of the creek from tide water. The specifications include the following quantities: foundation excavation (wet) 450 cu. yd., concrete 4,950 cu. yd., reinforcing steel 305,000 lb., concrete piles 15,900 l. ft., creosoted fir piles 12,200 l. ft., asphalt 2,820 sq. yd., rock fill 15,500 cu. yd., square timber No. 1 common 19,500 f. b. m., iron in timber including U-bolts 5,500 lb., 255 spring coils.

Accidents in the Streets of London.—From a government return it appears that 637 fatal accidents were caused in the metropolitan police district last year by vehicles in the streets. Non-fatal accidents numbered 25,239. Compared with the previous year's return, the fatal accidents have grown from 579 to 637 and the non-fatal from 18,944 to 25,239. The increase may be due in some measure to the darkening of the streets during the last quarter of the year. In the city of London there were 19 fatal accidents, as compared with 17, and 1,253 non-fatal as against 1,210 in the previous year. Dr. Waldo, the city coroner, who quotes these figures, attributes the comparative fewness of traffic accidents in the city to the excellence of the city police, the thorough and prompt manner in which means are taken for preventing accidents, and the superior legal powers in regard to traffic which the city possesses. The coroner, however, pleads for still more street refuges, more police at traffic points, and more life-guards or fenders for heavy motors.—*The Engineer, London.*

Railway Financial News

Boston & Maine.—Stockholders of the Fitchburg Railroad, which is leased to the Boston & Maine, have voted to cancel their authorization of $2,500,000 bonds made in 1914 and which bonds were never issued, and to authorize a sale of $3,175,000 bonds, the proceeds to be used to pay at maturity $500,000 4 per cent bonds due July 1, 1916, and to pay off floating debt and the obligations to the Boston & Maine for improvements made under the terms of the lease.

Canadian Pacific.—General Frank S. Meighen has been elected a director, succeeding Sir William Van Horne, deceased.

Chicago & North Western.—See comments on the company's annual report elsewhere in this issue.

Chicago, Rock Island & Pacific.—Both stockholders' committees have agreed on the following as candidates for the vacancies to be filled on the board of directors at the annual meeting on October 14 and these candidates have agreed to serve: Edmond D. Hulbert, president, Merchants Loan & Savings Bank, Chicago; Charles G. Dawes, president, Central Trust Company, Chicago; John R. Moron, president, Atlas Portland Cement Company; Judge Nathaniel French, Davenport, Iowa; William B. Thompson, director, Federal Reserve Bank, New York, and J. W. Burdick, president, West Penn Steel Company.

Under order of the court the receiver has paid all principal and interest, due October 1, on equipment obligations, the total payment amounting to about $3,000,000.

Chicago, St. Paul, Minneapolis & Omaha.—See comments on the company's annual report elsewhere in this issue.

Delaware & Hudson.—The New York Public Service Commission has authorized the Delaware & Hudson to issue $14,451,000 5 per cent 20-year convertible bonds. (See *Railway Age Gazette* of October 1, 1915, p. 623.)

Maryland & Pennsylvania.—No interest is to be paid on the $900,000 income bonds, the interest not having been earned. Interest payments are made in April and October, and the last payment of 2 per cent was made in April, 1914. The yearly rate from 1902 until 1914 was 4 per cent.

Missouri, Kansas & Texas.—The protective committee for the first and refunding 4 per cent bonds, consisting of A. J. Hemphill, Charles A. Peabody, W. A. Day and A. A. Jackson, has taken as an additional member Colgate Hoyt, of Colgate Hoyt & Co., New York.

A protective committee consisting of F. N. B. Close, Robert C. Drayton, R. Walter Leigh, William W. McClench and John W. Stedman, with P. D. Bogue, secretary, has been formed for the Texas & Oklahoma first mortgage 5 per cent bonds. The committee asks only the filing of names and addresses and amounts of holdings.

New York, New Haven & Hartford.—Judge Hunt, in the United State district court, has denied the application of Charles F. Brooker, Lewis Cass Ledyard, Henry K. McHarg, Charles M. Pratt and Frederick F. Brewster for a separate trial from Edward D. Robbins in the Sherman anti-trust suit which has been brought against directors and former directors of the New York, New Haven & Hartford. The court granted the request of Alexander Cochrane, who entered the New Haven board in 1909. Mr. Cochrane's case was considered to be in the same class as that of George F. Baker, T. DeWitt Cuyler, Theodore N. Vail, Francis T. Maxwell and Edward Milligan. These defendants have already been granted a separate trial.

Chinese Railway Accounts.—Steps have been taken by the Minister of Communications at Peking to have the accounting systems devised by the Unification of Accounts Commission introduced on the various Chinese railways. In accordance with this decision the Minister of Communications has notified the various railways that inspectors of accounts will be sent to the different railways from time to time to examine the accounts and to keep in close touch with the accounting work.

[ADVERTISEMENT]

ANNUAL REPORTS

CHICAGO AND NORTH WESTERN RAILWAY COMPANY, FIFTY-SIXTH ANNUAL REPORT

REPORT OF THE BOARD OF DIRECTORS

To the Stockholders of the Chicago and North Western Railway Company:

The Board of Directors submit herewith their report of the operations and affairs of the Chicago and North Western Railway Company for the fiscal year ending June 30, 1915.

The Interstate Commerce Commission having prescribed new classifications of accounts, effective July 1, 1914, the results for the preceding year shown in this report have been partially revised for the purpose of comparison.

Average number of miles operated, 8,107.82.

OPERATING REVENUES:		
Freight	$51,923,860.74	
Passenger	20,528,443.46	
Other Transportation	6,694,249.64	
Incidental	6,633,121.46	
Total Operating Revenues		$80,779,675.30
OPERATING EXPENSES (69.78 per cent. of Operating Revenues)		56,371,573.04
Net Revenue from Railway Operations		$24,408,102.26
RAILWAY TAX ACCRUALS (5.59 per cent. of Operating Revenues)	$4,516,943.10	
UNCOLLECTIBLE RAILWAY REVENUES	7,254.64	
		4,524,197.74
Railway Operating Income		$19,883,904.52
NON-OPERATING INCOME:		
Rental Income	$ 484,441.71	
Dividend Income	1,600,227.00	
Income from Funded Securities	5,505.83	
Income from Unfunded Securities and Accounts, and Other Items	709,825.41	
Total Non-Operating Income		2,799,999.95
Gross Income		$22,683,904.47
DEDUCTIONS FROM GROSS INCOME:		
Rental Payments	$1,066,043.00	
Interest on Funded Debt	9,595,615.81	
Other Deductions	108,196.57	
Total Deductions from Gross Income		10,769,855.38
Net Income		$11,914,049.09
DISPOSITION OF NET INCOME:		
Sinking Funds	$ 204,053.75	
Dividends—		
8% on Preferred Stock	1,791,600.00	
7% on Common Stock	9,108,015.00	
Total Appropriations		11,103,668.75
Balance Income for the year		$ 810,380.34

The results as compared with the preceding fiscal year were as follows:

Freight Revenue decreased		$2,065,614.69
Passenger Revenue decreased		1,012,099.33
Other Transportation Revenue decreased		563,402.66
Incidental Revenue decreased		138,542.73
Total Operating Revenues decreased		$3,779,659.41
Operating Expenses decreased		3,930,002.26
Net Revenue from Railway Operations increased		$ 150,342.85
Railway Tax Accruals increased	$264,152.81	
Uncollectible Railway Revenues increased	7,254.64	
		271,407.45
Railway Operating Income decreased		$ 121,064.60

Of the Operating Expenses for the current fiscal year $32,920,365.11, or 58.40 per cent., was paid employes for Labor, as compared with $34,098,916.25, or 56.55 per cent., paid during the preceding fiscal year. The decrease of $1,178,551.14 in the amount paid is accounted for as follows:

Decrease account less time worked	$1,226,711.22
Increase account higher rates of compensation	48,160.08
	$1,178,551.14

FREIGHT TRAFFIC

The details of Freight Traffic for the year ending June 30, 1915, compared with the preceding year, were as follows:

	1914	1915	Decrease Amount	Decrease Per Cent.
FREIGHT REVENUE	$53,989,475.43	$51,923,860.74	$2,065,614.69	3.83

	1914	1915	Increase or Decrease
TONS OF REVENUE FREIGHT CARRIED	43,309,643	40,399,215	6.72 Dec.
TONS OF REVENUE FREIGHT CARRIED ONE MILE	6,229,944,171	6,216,280,599	.22 Dec.
AVERAGE REVENUE RECEIVED PER TON	$1.25	$1.29	3.20 Inc.
AVERAGE REVENUE RECEIVED PER TON PER MILE	.87 of a cent	.84 of a cent	3.45 Dec.
AVERAGE DISTANCE EACH REVENUE TON WAS HAULED	143.85 miles	153.87 miles	6.97 Inc.
MILEAGE OF FREIGHT AND MIXED TRAINS	18,314,329	17,250,535	5.81 Dec.
AVERAGE NUMBER OF TONS OF ALL FREIGHT CARRIED PER TRAIN MILE:			
East of Missouri River	442.36	479.68	8.44 Inc.
West of Missouri River	205.95	203.49	1.19 Dec.
Whole Road	411.48	443.10	7.68 Inc.
AVERAGE NUMBER OF TONS OF ALL FREIGHT CARRIED PER LOADED CAR MILE	20.31	21.11	3.94 Inc.
AVERAGE FREIGHT REVENUE PER TRAIN MILE	$2.95	$3.01	2.03 Inc.

PASSENGER TRAFFIC

The details of Passenger Traffic for the year ending June 30, 1915, compared with the preceding year, were as follows:

	1914	1915	Decrease Amount	Decrease Per Cent.
PASSENGER REVENUE	$21,540,542.79	$20,528,443.46	$1,012,099.33	4.70

	1914	1915	Percentage of Decrease
REVENUE PASSENGERS CARRIED	33,389,428	33,079,550	.93 Dec.
REVENUE PASSENGERS CARRIED ONE MILE	1,173,435,140	1,130,297,641	3.68 Dec.
AVERAGE FARE PAID PER PASSENGER	65 cents	62 cents	4.62 Dec.
AVERAGE RATE PAID PER PASSENGER PER MILE	1.84 cents	1.82 cents	1.09 Dec.
AVERAGE DISTANCE TRAVELED PER REVENUE PASSENGER	35.14 miles	34.17 miles	2.76 Dec.
MILEAGE OF PASSENGER AND MIXED TRAINS	21,537,781	21,372,414	.77 Dec.
AVERAGE PASSENGER-TRAIN REVENUE PER TRAIN MILE	$1.27	$1.22	3.94 Dec.

MAINTENANCE OF WAY AND STRUCTURES

The total Operating Expenses of the Company for the year ending June 30, 1915, were $56,371,573.04; of this amount $10,450,739.45 was for charges pertaining to the Maintenance of Way and Structures. Included in these charges is a large part of the cost of 59,969 tons of steel rails, the greater portion of which was laid in replacement of rails of lighter weight in 441.23 miles of track; also the cost of 2,583,111 new ties.

The charges for Maintenance of Way and Structures also include a portion of the cost of ballasting 49.08 miles of track with crushed stone, 146.34 miles with gravel, and 21.44 miles with cinders; the erection, in place of wooden structures, of 55 new steel bridges on masonry, aggregating 3,550 feet in length and containing 3,885 tons of bridge metal; and the replacement of other wooden structures with masonry arch and box culverts and cast-iron pipes, the openings being filled with earth. The wooden structures replaced by permanent work aggregate 8,929 feet in length.

The charges on account of Maintenance of Way and Structures for the year ending June 30, 1915, compared with the preceding year, were:

COST OF RAILS:	1914	1915	Decrease
New steel rails	$1,212,258.90	$698,965.82	$513,293.08 Dec.
Usable and re-rolled rails	996,460.61	842,610.97	153,849.64 Dec.
	$2,208,719.51	$1,541,576.79	$667,142.72 Dec.
Less value of old rails and other items	1,484,363.53	1,191,307.88	293,055.65 Dec.
Net charge for rails	$724,355.98	$350,268.91	$374,087.07 Dec.
COST OF TIES	1,762,313.18	1,547,651.05	214,662.13 Dec.
COST OF BALLAST	227,056.25	117,254.77	109,801.48 Dec.
COST OF OTHER TRACK MATERIAL	539,118.33	375,613.88	163,504.45 Dec.
ROADWAY AND TRACK LABOR AND OTHER EXPENSES	5,073,539.12	4,486,656.40	586,882.72 Dec.
Total Charges for Roadway and Track	$8,326,382.86	$6,877,445.01	$1,448,937.85 Dec.
Other Charges Account Maintenance of Way and Structures were:			
BRIDGES, TRESTLES AND CULVERTS	937,863.85	833,833.69	104,030.16 Dec.
ROAD CROSSINGS, FENCES, ETC.	331,200.62	296,673.21	34,527.41 Dec.
SIGNALS AND INTERLOCKERS	434,770.48	419,141.63	15,628.85 Dec.
BUILDINGS, FIXTURES AND GROUNDS	1,229,186.84	995,745.24	233,441.60 Dec.
DOCKS AND WHARVES	53,975.41	88,452.05	34,476.64 Inc.
SUPERINTENDENCE	522,712.02	515,022.78	7,689.24 Dec.
ROADWAY TOOLS AND SUPPLIES	150,540.57	130,502.96	20,037.61 Dec.
SUNDRY MISCELLANEOUS CHARGES	226,462.07	293,922.88	67,460.81 Inc.
Total Charges Account Maintenance of Way and Structures	$12,213,094.72	$10,450,739.45	$1,762,355.27 Dec.

The above charges for Maintenance of Way and Structures for the current year amount to 18.54 per cent of the total Operating Expenses, as compared with 20.25 per cent for the preceding fiscal year.

MAINTENANCE OF EQUIPMENT

The charges on account of Maintenance of Equipment for the year ending June 30, 1915, compared with the preceding year, were as follows:

	1914	1915	Increase or Decrease
LOCOMOTIVES	$4,831,466.36	$4,740,217.79	$91,248.57 Dec.
PASSENGER-TRAIN CARS	1,252,013.63	1,268,877.15	16,863.52 Inc.
FREIGHT-TRAIN CARS	5,445,489.09	5,873,407.23	427,918.14 Inc.
WORK EQUIPMENT	145,882.97	156,987.57	11,104.60 Inc.
SHOP MACHINERY AND TOOLS	229,921.15	170,396.43	59,524.72 Dec.
Superintendence	359,527.39	354,854.54	4,672.85 Dec.
SUNDRY MISCELLANEOUS CHARGES	94,187.14	84,194.47	9,992.67 Dec.
Total Charges Account Maintenance of Equipment	$12,358,487.73	$12,648,935.18	$290,447.45 Inc.

The above charges for Maintenance of Equipment for the current year amount to 22.44 per cent of the total Operating Expenses, as compared with 20.49 per cent for the preceding fiscal year.

RESERVE FOR ACCRUED DEPRECIATION ON EQUIPMENT

At the close of the preceding fiscal year there was a balance to the credit of the Equipment Reserve Accounts of	$6,089,239.37
During the year ending June 30, 1915, there was credited to the Equipment Reserve Accounts on account of charges to Operating Expenses for Accrued Depreciation	2,323,461.58
	$8,412,700.95
And there was charged during the year against the above amount the Accrued Depreciation previously credited this account on Equipment retired or transferred from one class of service to another	263,281.48
Leaving a balance to the credit of the Equipment Reserve Accounts on June 30, 1915, of	$8,149,419.47

TRANSPORTATION EXPENSES

The Transportation Expenses of the Company for the year ending June 30, 1915, were $29,753,444.06, or 52.78 per cent of the total Operating Expenses. Of this amount $19,268,640.36, or 64.76 per cent, was charged for labor; $5,842,571.64, or 19.64 per cent, was charged for fuel for locomotives; and $4,642,232.06, or 15.60 per cent, was charged for supplies and miscellaneous items. The decrease in the Transportation Expenses for the year ending June 30, 1915, as compared with the preceding fiscal year, was $2,195,793.88, or 6.87 per cent, distributed as follows:

Decrease in amount charged for labor	$ 547,529.01
Decrease in amount charged for fuel for locomotives	1,063,155.48
Decrease in amount charged for supplies and miscellaneous items	585,109.39
	$2,195,793.88

CAPITAL STOCK

There was no change during the year in the Capital Stock and Scrip of the Company.

The Company's authorized Capital Stock is Two Hundred Million Dollars ($200,000,000.00), of which the following has been issued to June 30, 1915:

Common Stock and Scrip held by the Public	$130,117,028.82	
Common Stock and Scrip owned by the Company	2,338,502.15	
Total Common Stock and Scrip		$132,455,530.97
Preferred Stock and Scrip held by the Public	$22,395,120.00	
Preferred Stock and Scrip owned by the Company	3,834.56	
Total Preferred Stock and Scrip		22,398,954.56
Total Capital Stock and Scrip, June 30, 1915		$154,854,485.53

FUNDED DEBT

At the close of the preceding fiscal year the amount of Funded Debt, exclusive of Bonds in the Treasury and Due from Trustee, was		$214,879,000.00
The above amount has been decreased during the year ending June 30, 1915, by Bonds and Equipment Trust Certificates redeemed or transferred, as follows:		
C. & N. W. Ry. Consolidated Sinking Fund Currency of 1915, 7%, matured February 1, 1915, viz.:		
Redeemed	$12,669,000.00	
Unpresented and transferred to "Current Liabilities"	163,000.00	
		$12,832,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1912, 4½%, redeemed, viz.:		
Series A	$300,000.00	
Series B	300,000.00	
Series C	400,000.00	
		1,000,000.00
C. & N. W. Ry. Sinking Fund of 1879, 6%, redeemed		6,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%, redeemed		183,000.00
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5% redeemed		26,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%, redeemed		251,000.00
Total Funded Debt Redeemed or Transferred		14,298,000.00
		$200,581,000.00
And the above amount has been increased by Bonds sold during the year, as follows:		
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, 5%, sold to re-imburse the Company for past expenditures made for construction and in redeeming matured bonds		10,000,000.00
Total, June 30, 1915		$210,581,000.00
Net Decrease during the year		4,298,000.00

BONDS IN THE TREASURY AND DUE FROM TRUSTEE

At the close of the preceding fiscal year the amount of the Company's Bonds in the Treasury and due from Trustee was		$4,173,000.00
The above amount has been increased during the year ending June 30, 1915, as follows:		
C. & N. W. Ry. 5% Sinking Fund Bonds of 1879, Redeemed	$59,000.00	
M. L. S. & W. Ry. 5% Extension and Improvement Sinking Fund Mortgage Bonds, Redeemed	17,000.00	
C. & N. W. Ry. 5% Sinking Fund Debentures of 1933 Redeemed	131,000.00	
C. & N. W. Ry. General Mortgage Gold Bonds of 1987 Due from Trustee in Exchange for Bonds Retired, viz.:		
C. & N. W. Ry. Consolidated Sinking Fund Currency, 7%	$12,669,000.00	
C. & N. W. Ry. Sinking Fund Bonds of 1879, 6%	6,000.00	
C. & N. W. Ry. Sinking Fund Bonds of 1879, 5%	124,000.00	
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5%	38,000.00	
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%	124,000.00	
		12,961,000.00
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, Due from Trustee on Account of Construction Expenditures Made During the Year		1,000,000.00
		14,168,000.00
		$18,341,000.00

The Bonds on hand and due from Trustee have been decreased during the year, as follows:

C. & N. W. Ry. General Mortgage Gold Bonds of 1987, 5% Sold to Reimburse the Company for Past Expenditures Made for Construction and in Redeeming Matured Bonds	$10,000,000.00	
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5% Bonds, Retired	29,000.00	
C. & N. W. Ry. 5% Sinking Fund Debentures of 1933, Retired	4,000.00	
C. & N. W. Ry. 4½% Equipment Trust Certificates of 1913, Retired	400,000.00	
		10,433,000.00
Total, June 30, 1915		$7,908,000.00
Net Increase during the year		$3,735,000.00

CONSTRUCTION

The construction charges for the year ending June 30, 1915, were as follows:

On Account of Elevating Tracks, viz.:			
In River Forest, Illinois		$142,738.84	
Greenfield Avenue north, Milwaukee, Wis.		285,188.73	
			$427,927.57
On Account of Extensions, viz.:	Miles		
Kingston Extension, Wisconsin	15.60	$94,515.11	
Koepenick Extension, Wisconsin	7.19	96,956.29	
			191,471.40
Sundry Construction:			
Land for Transportation Purposes		$ 97,224.99	
Buildings and Fixtures		459,039.15	
Bridges, Trestles and Culverts		692,157.60	
New Sidings, Yard Tracks and Spurs to Industries		227,333.74	
Crossings and Signs		61,530.87	
Signals and Interlockers		52,532.99	
Reduction of Grade between Nelson and Peoria, Illinois		289,482.40	
Betterment of Roadway and Track		694,869.53	
Shop Machinery		50,490.41	
Miscellaneous Construction, including Fences, Wharves and Docks, and other items		94,201.65	
			2,718,863.33
Equipment:			
40 Steam Locomotives, 5,000 Freight-train Cars, 70 Passenger-train Cars, and 260 Work Equipment Cars		$6,292,698.95	
Improvement of Equipment		403,681.03	
		$6,696,379.98	
Less Original Cost of Equipment Retired, as follows:			
30 Locomotives	$236,780.30		
2,639 Freight-train Cars	1,420,108.78		
26 Passenger-train Cars	190,725.47		
285 Work Equipment Cars	47,754.46		
Other Items	32,169.29		
		1,927,538.30	
			4,768,841.68
			$8,107,103.98
Account Cost of Milwaukee, Sparta and North Western Railway			14,340.44
Account Cost of Des Plaines Valley Railway			10,602.87
Account Cost of St. Louis, Peoria and North Western Railway			53,273.65
			$8,185,320.94

LANDS

During the year ending June 30, 1915, 3,663.84 acres and 88 town lots of the Company's Land Grant lands were sold for the total consideration of $41,698.01. The number of acres remaining in the several Grants June 30, 1915, amounted to 327,530.81 acres, of which 18,790.19 acres were under contract for sale, leaving unsold 308,740.62 acres.

Appended hereto may be found statements, accounts, and statistics relating to the business of the fiscal year, and the condition of the Company's affairs on June 30, 1915.

By order of the Board of Directors.

WILLIAM A. GARDNER,
President.

PROFIT AND LOSS ACCOUNT, JUNE 30, 1915

Dr.	
Depreciation accrued prior to July 1, 1907, on equipment retired or changed from one class to another during the current fiscal year	$854,174.69
Net loss on property sold or abandoned and not replaced	100,485.45
Debt discount extinguished through surplus	145,867.20
Miscellaneous Debits	20,023.23
Balance Credit, June 30, 1915, carried to Balance Sheet	35,875,758.00
	$36,996,308.57
Cr.	
Balance, June 30, 1914	$35,998,882.89
Balance Income for year ending June 30, 1915, brought forward from Income Account	810,380.34
Donations	114,611.90
Miscellaneous Credits	72,433.44
	$36,996,308.57

CHICAGO, SAINT PAUL, MINNEAPOLIS AND OMAHA RAILWAY COMPANY, THIRTY-FOURTH ANNUAL REPORT

REPORT OF THE BOARD OF DIRECTORS

To the Stockholders of the Chicago, Saint Paul, Minneapolis and Omaha Railway Company:

The Board of Directors submit herewith their report of the operations and affairs of the Chicago, Saint Paul, Minneapolis and Omaha Railway Company for the fiscal year ending June 30, 1915.

The Interstate Commerce Commission having prescribed new Classifications of Accounts, effective July 1, 1914, the results for the preceding year, shown in this report, have been partially revised for the purpose of comparison.

Average number of miles operated, 1,752.81.

OPERATING REVENUES:		
Freight	$11,523,103.44	
Passenger	4,983,699.89	
Other Transportation	1,022,194.88	
Incidental	312,349.47	
Total Operating Revenues		$17,841,347.68
OPERATING EXPENSES (67.86 per cent of Operating Revenues)		12,107,597.51
Net Revenue from Railway Operations		$ 5,733,750.17
RAILWAY TAX ACCRUALS (5.69 per cent of Operating Revenues)	$1,015,028.61	
UNCOLLECTIBLE RAILWAY REVENUES	4,834.59	1,019,863.20
Railway Operating Income		$ 4,713,886.97
NONOPERATING INCOME:		
Rental Income	$269,811.98	
Dividend Income	46,351.00	
Income from Funded Securities	15,220.00	
Income from Unfunded Securities and Accounts and other items	24,111.61	
Total Nonoperating Income		355,494.59
Gross Income		$ 5,069,381.56
DEDUCTIONS FROM GROSS INCOME:		
Rental Payments	$ 673,696.23	
Interest on Funded Debt	2,152,312.50	
Other Deductions	24,288.17	
Total Deductions from Gross Income		2,850,296.90
Net Income		$ 2,219,084.66
DISPOSITION OF NET INCOME:		
Dividends—		
7% on Preferred Stock	$ 787,976.00	
7% on Common Stock	1,298,934.00	
		2,086,910.00
Balance Income for the year		$ 132,174.66

The results as compared with the preceding fiscal year were as follows:

Passenger Revenue decreased	$432,010.30	
Other Transportation Revenue decreased	48,848.70	
		$480,859.00
Freight Revenue increased	$ 95,540.20	
Incidental Revenue increased	16,583.09	
		112,123.29
Total Operating Revenues decreased		$368,735.71
Operating Expenses decreased		726,519.41
Net Revenue from Railway Operations increased		$357,783.70
Railway Tax Accruals increased	$ 41,745.78	
Uncollectible Railway Revenues increased	4,834.59	
		46,580.37
Railway Operating Income increased		$311,203.33

Of the Operating Expenses for the current fiscal year $6,599,357.35, or 54.51 per cent, was paid employees for labor, as compared with $6,966,716.33, or 54.28 per cent, paid during the preceding fiscal year. The decrease of $367,358.98 in the amount paid is accounted for as follows:

Decrease account less time worked	$306,417.18
Decrease account lower rates of compensation	60,941.80
	$367,358.98

PASSENGER TRAFFIC

The Details of Passenger Traffic for the year ending June 30, 1915, compared with the preceding year, were as follows:

	1914	1915	DECREASE Amount	DECREASE Per Cent
PASSENGER REVENUE	$5,415,710.19	$4,983,699.89	$432,010.30	7.98

	1914	1915	Percentage of Decrease
PASSENGERS CARRIED	4,881,961	4,767,826	2.34 Dec.
PASSENGERS CARRIED ONE MILE	266,685,999	252,305,000	5.39 Dec.
AVERAGE FARE PAID PER PASSENGER	110.93 cents	104.53 cents	5.77 Dec.
AVERAGE RATE PAID PER PASSENGER PER MILE	2.031 cents	1.975 cents	2.76 Dec.
AVERAGE DISTANCE TRAVELED PER PASSENGER	54.63 miles	52.92 miles	3.13 Dec.
MILEAGE OF REVENUE PASSENGER AND MIXED TRAINS	4,510,639	4,349,764	3.57 Dec.
AVERAGE PASSENGER TRAIN REVENUE PER TRAIN MILE	$1.40	$1.34	4.29 Dec.

FREIGHT TRAFFIC

The details of Freight Traffic for the year ending June 30, 1915, compared with the preceding year, were as follows:

	1914	1915	INCREASE Amount	INCREASE Per Cent
FREIGHT REVENUE	$11,427,563.24	$11,523,103.44	$95,540.20	.84

	1914	1915	Percentage of Increase or Decrease
TONS OF REVENUE FREIGHT CARRIED	8,466,632	8,794,488	3.87 Inc.
TONS OF REVENUE FREIGHT CARRIED ONE MILE	1,294,143,291	1,336,106,367	3.24 Inc.
AVERAGE REVENUE RECEIVED PER TON	$1.35	$1.31	2.96 Dec.
AVERAGE REVENUE RECEIVED PER TON PER MILE	.88 of a cent	.86 of a cent	2.27 Dec.
AVERAGE DISTANCE EACH REVENUE TON WAS HAULED	152.85 miles	151.93 miles	.60 Dec.
MILEAGE OF FREIGHT AND MIXED TRAINS	4,255,990	4,026,069	5.40 Dec.
AVERAGE NUMBER OF TONS OF ALL FREIGHT CARRIED PER TRAIN MILE	330.67	360.13	8.91 Inc.
AVERAGE NUMBER OF TONS OF ALL FREIGHT CARRIED PER LOADED CAR MILE	19.39	20.39	5.16 Inc.
AVERAGE FREIGHT REVENUE PER TRAIN MILE	$2.69	$2.86	6.32 Inc.

MAINTENANCE OF WAY AND STRUCTURES

The total Operating Expenses of the Company for the year ending June 30, 1915, were $12,107,597.51; of this amount $1,956,803.49 was for charges pertaining to Maintenance of Way and Structures. Included in these charges are $130,942.38 for steel rails, $229,376.56 for ties, and the cost of re-ballasting 24.01 miles with gravel and cinders, also part cost of replacing 1,934 feet of wooden bridging with permanent work.

During the year 11,408 tons of new steel rails and 6,446 tons of usable and re-rolled steel rails were laid in track, a greater portion of which replaced rails of lighter weight; 372,974 ties of all descriptions were laid in renewals.

The details of the charges to Maintenance of Way and Structures for the year, compared with the previous year, were as follows:

COST OF RAILS:	1914	1915	Increase or Decrease
New steel rails	$392,057.11	$362,580.63	$29,476.48 Dec.
Usable and re-rolled rails	143,572.52	138,315.69	5,256.83 Dec.
	$535,629.63	$500,896.32	$34,733.31 Dec.
Less value of old rails and other items	366,663.79	369,953.94	3,290.15 Inc.
Net charge for rails	$168,965.84	$130,942.38	$38,023.46 Dec.
COST OF TIES	525,024.76	229,376.56	295,648.20 Dec.
COST OF BALLAST	51,996.80	20,270.06	31,726.74 Dec.
COST OF OTHER TRACK MATERIAL	89,442.67	117,233.06	27,790.39 Inc.
Carried forward	$835,430.07	$497,822.06	$337,608.01 Dec.

	1914	1915	Increase or Decrease
Brought forward	$835,430.07	$497,822.06	$337,608.01 Dec.
ROADWAY AND TRACK LABOR AND OTHER EXPENSES	860,749.04	774,745.18	86,003.86 Dec.
Total Charges for Roadway and Track	$1,696,179.11	$1,272,567.24	$423,611.87 Dec.

Other Charges Account of Maintenance of Way and Structures were as follows:

BRIDGES, TRESTLES AND CULVERTS	295,994.49	159,950.88	136,043.61 Dec.
ROAD CROSSINGS, FENCES, ETC.	70,010.91	64,003.35	6,007.56 Dec.
SIGNALS AND INTERLOCKING PLANTS	30,288.21	28,082.14	2,206.07 Dec.
BUILDINGS, FIXTURES AND GROUNDS	244,206.25	207,458.28	36,747.97 Dec.
DOCKS AND WHARVES	2,636.23	Cr. 96.30	2,732.53 Dec.
SUPERINTENDENCE	111,551.70	107,451.21	4,100.49 Dec.
ROADWAY TOOLS AND SUPPLIES	23,742.73	24,502.41	759.68 Dec.
SUNDRY MISCELLANEOUS CHARGES	152,578.97	92,884.28	59,694.69 Dec.
Total Charges Account of Maintenance of Way and Structures	$2,627,188.60	$1,956,803.49	$670,385.11 Dec.

The above charges for Maintenance of Way and Structures for the current year amount to 16.16 per cent of the total Operating Expenses, as compared with 20.47 per cent for the preceding fiscal year.

MAINTENANCE OF EQUIPMENT

The charges on account of Maintenance of Equipment for the year ending June 30, 1915, compared with the preceding year, were as follows:

	1914	1915	Increase or Decrease
LOCOMOTIVES	$915,313.10	$975,126.79	$59,813.69 Inc.
FREIGHT-TRAIN CARS	923,035.34	1,061,967.59	138,932.25 Inc.
PASSENGER-TRAIN CARS	287,841.23	265,800.71	22,040.52 Dec.
WORK EQUIPMENT	33,067.42	35,127.09	2,059.67 Inc.
SHOP MACHINERY AND TOOLS	33,788.02	31,300.56	2,487.46 Dec.
SUPERINTENDENCE	63,083.97	68,929.43	5,845.46 Inc.
SUNDRY MISCELLANEOUS CHARGES	46,995.43	38,704.54	8,290.89 Dec.
Total Charges Account of Maintenance of Equipment	$2,303,124.51	$2,476,956.71	$173,832.20 Inc.

The above charges for Maintenance of Equipment for the current year amount to 20.46 per cent of the total Operating Expenses, as compared with 17.95 per cent for the preceding fiscal year.

TRANSPORTATION EXPENSES

The Transportation Expenses of the Company for the year were $6,737,697.17, or 55.65 per cent of the Total Operating Expenses. Of this amount $3,639,774.85, or 54.02 per cent, was for labor; $1,922,464.65, or 28.53 per cent, was for fuel for locomotives; and $1,175,457.67, or 17.45 per cent, was for supplies and miscellaneous items.

The total decrease in the charges as compared with the preceding year was $195,205.38, distributed as follows:

Decrease in amount charged for labor	$188,447.73
Decrease in amount charged for fuel for locomotives	121,627.28
Increase in amount charged for supplies and miscellaneous items	114,869.63
	$195,205.38

By order of the Board of Directors.

WILLIAM A. GARDNER,
President.